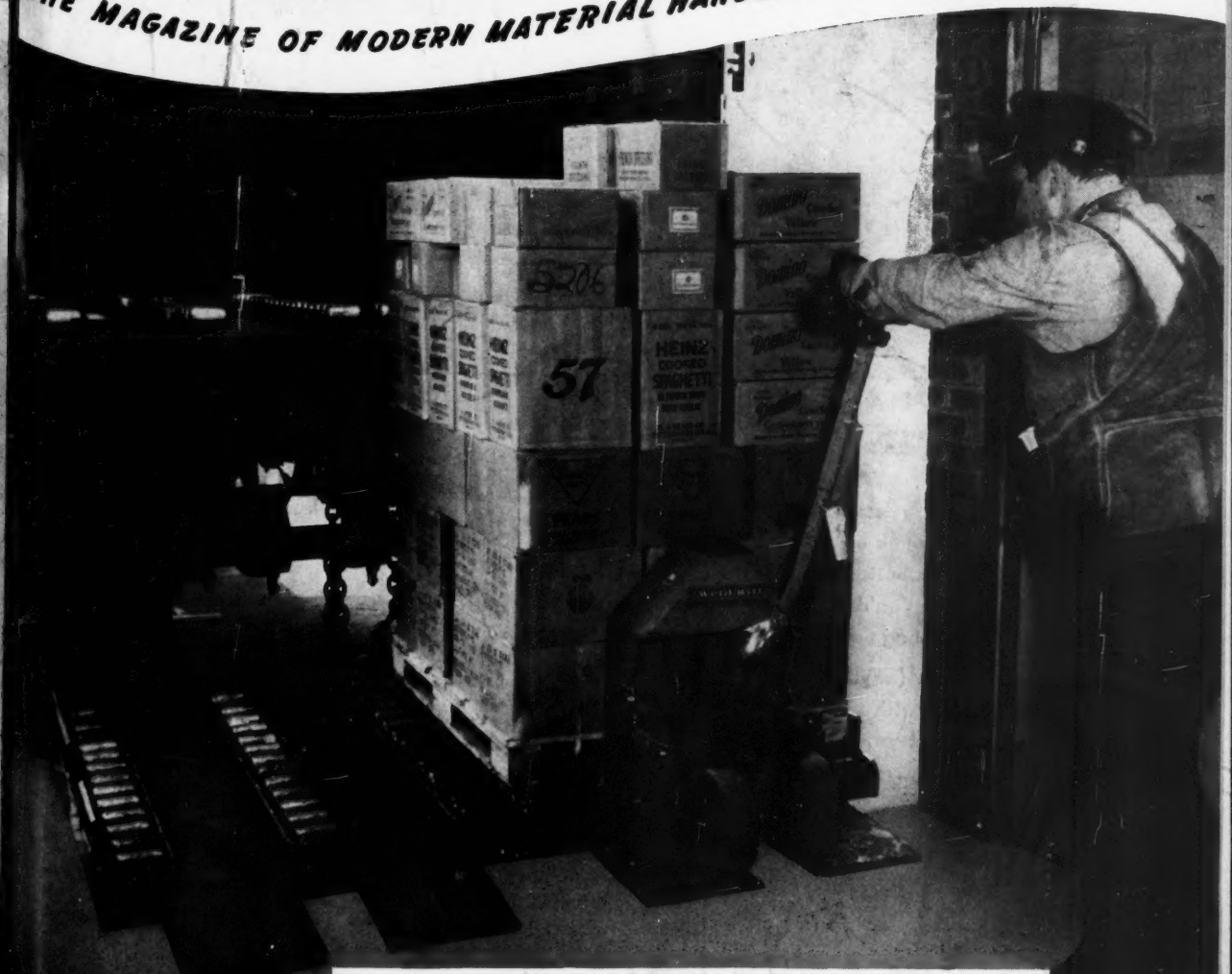
MARCH 1949

Flow

THE MAGAZINE OF MODERN MATERIAL HANDLING AND PACKAGING METHODS



Roller Conveyors in trucks of this retail food chain company extend over hydraulic tailgates. Absence of docks at stores is no problem. Pallet hand truck is designed for this operation. — Courtesy, Fisher Bros. Co., Cleveland.

IN THIS ISSUE: { Engineering Data Page, New Feature . . .
First Prize Contest Paper . . . Maintenance

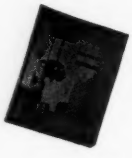
Take a Tip— buy a ZIP!

P&H
ZIP-LIFT
HARNISCHFEGER CORP. MILWAUKEE, WIS.

WHY settle for anything less? The Zip-Lift is the real wire rope electric hoist — with full magnetic push-button control — and the top-notch qualities you'd expect only in the most expensive hoisting equipment.

If you have heavy loads (anything up to 2,000 lbs.) you can't lose with a Zip-Lift. It starts earning the moment you hang it up on hook, jib or trolley — pays for itself several times a year. Why postpone the savings it brings you? Add a new Zip to your production — now!

Ask for your copy of Bulletin H20-3. It covers everything you want to know about the P&H Zip-Lift — applications, pictures, specifications, etc.



These are Added Values!

SAFER—Control current is reduced to 110 volts at the push-button. Crane type limit switch and double brakes provide maximum safety.

LIFETIME CONSTRUCTION — Shaved gears — grease-sealed bearings — precision construction — moisture-proof, dust-proof, acid-proof.

SMOOTHER OPERATION — Motor specifically built for hoist service — high starting torque, frequent reversal, etc. Controls loads within a fraction of an inch.

ALERT SERVICE — Out-of-stock delivery from qualified dealers everywhere — backed by 18 branch offices and 8 conveniently located warehouses.

The Zip-Lift is America's fastest selling wire rope hoist.

Handle it "thru-the-air" at lower cost

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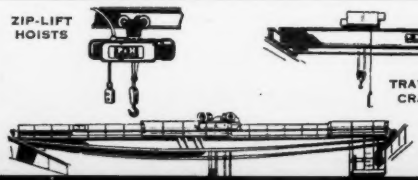
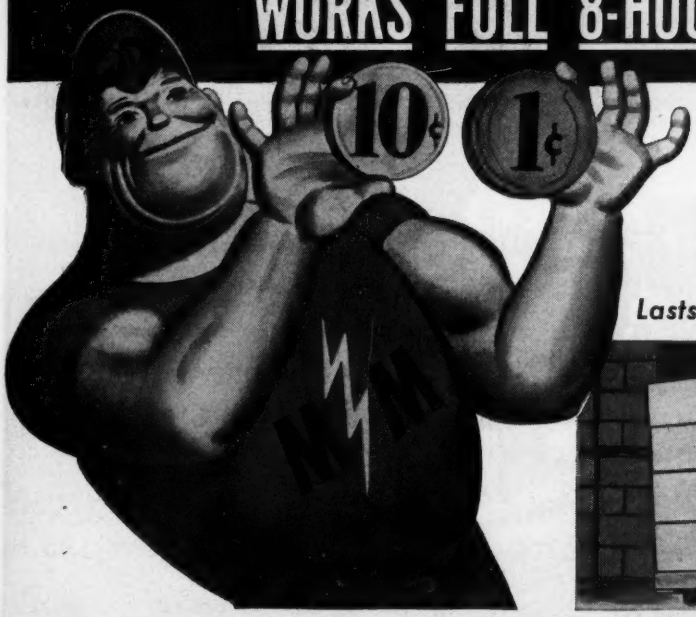
ELECTRIC HOISTS
4643 West National Avenue
Milwaukee 14, Wis.
HARNISCHFEGER
CORPORATION
HOISTS • WELDING ELECTRODES • MOTORS • P&H • EXCAVATORS • ELECTRIC CRANES • ARC WELDERS

HEVI-LIFT



AMAZING AUTOMATIC ELECTRIC TRUCK CUTS HANDLING COSTS IN HALF WORKS FULL 8-HOUR DAY FOR 11c!*



Hauls and stacks tons of products with push-button ease

Lasts Many, Many Trouble-Free Years!

CUTS HANDLING COSTS THOUSANDS OF DOLLARS

IMAGINE an electric truck that works a full 8-hour day for as little as *11c a day battery charging cost . . . and cuts your handling costs in half . . . savings amounting to thousands of dollars, depending on the tonnage you move in your plant.

That's what amazing Automatic Transporter will do for you . . . lift and move 2,000, 4,000 and 6,000 pound loads with feather-touch of thumb on electric control buttons.

Note its effortless operation in the picture above. Could anything be easier, more efficient, time saving? And how it "lightens labor's load." Muscle Mike, the brawny midget of electrical power in its motor does all the work. One man does more with less effort than three hand truckers, releasing labor for more productive work.

Transporter's bigger sister, the new Tilting Type Transtacker, also STACKS your product . . . gives you faster, safer load spotting and cradling . . . with a single lift of 64 inches and a telescopic lift of 120 inches.

Here's an extra bonus of free storage space to heights manual handling couldn't touch. See the picture to the left . . . *picture* the dollars saved it will bank for you. Works long, steady on same battery as Transporter . . . operating cost is fantastically low.

Transtractor, shown lower left, will push or pull 6000 pounds all day long or up to 20,000 pounds intermittently. Again, finger-tip control, low cost Transporter battery operation.

Either one, or all of these Transtriplet miracle electric trucks will do a material handling job that will total up to savings that will astound you . . . with operating cost a minor factor. Let us tell you, and show you more in our free material handling catalog. Mail coupon.

Transporter
A PRODUCT OF AUTOMATIC
Lightens LIFE'S LOADS

AUTOMATIC TRANSPORTATION CO.
DIV. OF THE YALE & TOWNE MFG. CO.
141 West 87th Street, Dept. C-9, Chicago 20, Ill.

Send me complete facts and FREE catalog describing fully ( ) Transporter ( ) Transtacker ( ) Transtractor, and the material handling savings they can bring my business.

Company Name .....
By .....
Street Address .....
City ..... *Zone* ..... *State* .....

Only GOULD Has It!

A modern research laboratory with pilot manufacturing plant to produce advance-design batteries constantly created— and tested before production.

The Metallioscope, a combination high-powered microscope and camera, is helping Gould scientists find the answer to age-old lead casting problems. With it, the complex crystalline structure of lead castings has become an open book. As a result, information rapidly becoming available points the way to even stronger, electrically more efficient grid frames, posts, straps and connectors. For better batteries always, choose GOULD—FOR FIFTY YEARS THE CHOICE OF ENGINEERS.

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STORAGE BATTERY CORPORATION

Flow

VOL. 3, NO. 9 MARCH, 1949

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● Manufacturing a wide variety of pressure and gravity vessels over the years has earned the Chattanooga Boiler and Tank Company a reputation for industrial versatility. The many installations produced and erected in almost every field of processing and converting, enable our organization to help you with your specific materials storage problem. Our experienced craftsmen take pride in meeting your requirements with products designed and fabricated to give you maximum performance with a minimum of maintenance.

CHATTANOOGA BOILER and TANK CO.

Chattanooga, Tenn.

STEEL SOUTHLAND PRODUCTS

OVER 40 YEARS OF SERVICE TO AMERICAN INDUSTRY

BIG SAVINGS made with ELWELL-PARKERS!

Saves $20.65 For Each Car Unloaded

This direct labor saving was made when handling by an E-P truck replaced manual unloading of sheet metal. Master unit loads weighing 2,500 lbs. are now high tiered, with greater safety, and in less time.

Saves $64 Daily By Using "AIR RIGHTS"

Profitable use of *all* overhead space is achieved by warehouse owner whose E-P trucks high tier palletized barrels. These hazardous-to-handle units are safely stored in this manner. Savings—$64 in 8 hours.

Saves $41 Per Car By Palletization

Unloading boxcar, 1 bag at a time, was slow, expensive and wasteful due to broken bags. After supplier palletized, an E-P truck unloaded cars so quickly and economically that it soon repaid its cost.

FREE BOOKLET
on Scientific Materials Handling.

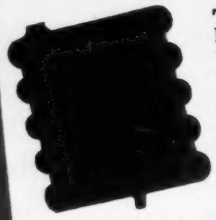
Ask for a copy of "Industrial Logistics"

Because of their reliable performance, Elwell-Parkers have been making these economies for years—today the savings are *even greater* as compared to less efficient and less dependable methods. The Elwell-Parker Electric Company, 4539 St. Clair Avenue, Cleveland 3, Ohio.

ELWELL-PARKER
POWER INDUSTRIAL TRUCKS
Established 1893

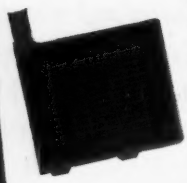
EXIDE-IRONCLAD BATTERIES *are DIFFERENT!*

DESIGNED FOR STATIONARY USE



The manchester type of positive plate has the unique lead button construction... rolled strips of corrugated lead, pressed into holes of lead antimony grid. It is widely used by electric utilities, telephone and telegraph companies, radio and television stations... and for railway signal systems, emergency lighting and other stationary applications.

DESIGNED FOR AUTOMOBILE USE



The Exide flat positive plate is of staggered grid construction, pasted with active material which years of experience has proved most efficient and durable for the services for which it was designed. Used for starting, lighting, ignition and other services in cars, trucks, buses, aircraft and general storage battery tasks.

DESIGNED FOR MOTIVE POWER

The Exide-Ironclad positive plate, of slotted tube construction, was developed by Exide Engineers to provide a battery of extra power, sturdiness and durability to meet the exacting needs of motive power equipment. Exide-Ironclad Batteries are noted for high capacity and ability to deliver adequate power throughout each shift. Fully described on opposite page.

1888

DEPENDABLE BATTERIES FOR 61 YEARS

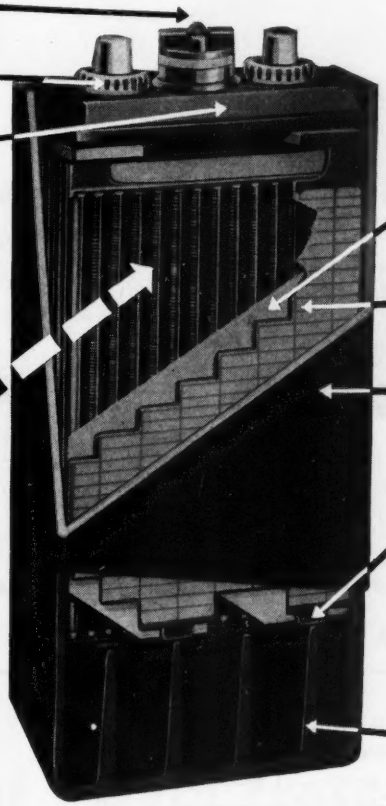
1949

Many Outstanding Features

VENT PLUG
Specially designed to prevent escape of electrolyte.

GREASE SEAL RING NUT
Holds battery elements securely in place . . . prevents creepage of electrolyte . . . keeps tops clean and dry.

SEALED CELL COVER
Flush with top of jar. Prevents collection of dirt or moisture . . . keeps impurities out of cell . . . eliminates leakage of electrolyte.



SEPARATOR
Of high porosity, specially treated to last the life of the battery.

NEGATIVE PLATE
Made extra heavy and built to match the long life of the positive plate.

JAR
Made of specially tough and durable Giant Compound. Built to withstand the jolts and jars of hard industrial usage. Practically unbreakable in normal service.

FEET
Internal short circuits practically eliminated by having the two feet on negative plate rest on different ribs from those of the positive plate, and by having separators extend below both plates and rest on all four ribs.

RIBS
Support all plates and separators. Their height provides generous sediment space, so that internal cleaning is unnecessary.

DEPENDABLE POWER

Exide-Ironclad Batteries have ALL FOUR of the characteristics that a storage battery must have to assure maximum performance from battery electric industrial trucks—high power ability, high electrical efficiency, ruggedness and a long life with minimum maintenance. The combination of these four Exide-Ironclad characteristics assures years of dependable day-in, day-out service with economy.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 32
Exide Batteries of Canada, Limited, Toronto

"Exide" and "Exide-Ironclad"
Reg. Trade-marks U.S. Pat. Off.

up a tree

WITH HIGH HANDLING COSTS

It takes a lot of motion—wasted motion—to stack boxes by hand methods. Here, the camera records this picture of wasted time and effort by means of light bulbs placed on the 3 men's wrists.

BARRETT PORTABLE ELEVATORS
bring costs down to earth

Get the story on other Barrett cost-cutters, too. Send for your free copy of the Barrett Junior Catalog.

Are you wasting time and money like this in costly hand operations? Waste that is repeated hundreds of times a day! With a Barrett Elevator, you eliminate this waste . . . 1 man—not 3—does a quicker, more efficient job. He saves the plant money hundreds of times a day. *Costs are brought down to earth!*

SAVE ON FLOOR SPACE, TOO! Some materials, too heavy for hand stacking, often require floor level storage. Here again Barrett Portable Elevators save . . . by putting that wasted air space to work, clearing floor space for extra production. They save on heat and light—save on maintenance . . . perhaps even save the cost of a new building.

Space, labor . . . or both . . . whatever your problem may be . . . Barrett can help you. Write for full details.

BARRETT-CRAVENS COMPANY 4619 South Western Blvd., Chicago 9, Illinois
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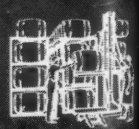
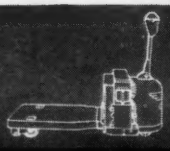
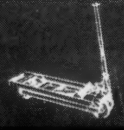


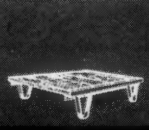
BARRETT

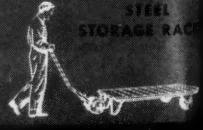
ONE MAN DOES MORE THAN 3 OR 4 . . . WITH A BARRETT

Barrett Handling Equipment









Shipments that travel cross-country without leaving the room

You're looking at a railroad flatcar of standard truck and spring construction that's used by our engineers to pre-test methods of shipment protection.

As the wheels of this car rotate . . . at speeds up to 60 miles an hour . . . the test crates and cartons you see in the picture are subjected to the same type vibrations that cause chafing and "walking" of actual shipments.

From realistic tests such as this . . . and we conduct a wide variety, both in the laboratory and in the field . . . our engineers learn what *really* causes shipping damage. Then they translate that knowledge into better ways of bracing and packaging the products *you* ship.

If you would like to draw on this experience for the purpose of speeding your shipping room operations, cutting your costs and reducing damage claims, write—

SIGNODE STEEL STRAPPING COMPANY
2618 N. Western Ave. • Chicago 47, Illinois

SIGNODE* *means*—

- Steel strapping
- Strapping tools
- Power strapping machines
- Special lithographed seals
- BrakemaN* plates
- Anchor plates
- Retaining strips
- Retaining doors

*Reg. U. S. Pat. Off.

SIGNODE* RESEARCH ASSURES BETTER SHIPPING PROTECTION

HOW BIG WILL YOUR BENEFITS BE?

They save money! That is one of the most potent facts to be crystallized by the collective experience of Clark fork-lift truck users. On the basis of that experience the real question for you is: how big can *your* benefits be?

In every conceivable kind of business that processes, handles, ships, stores or carries materials, the Clark Method is Industry's first choice by a wide margin.

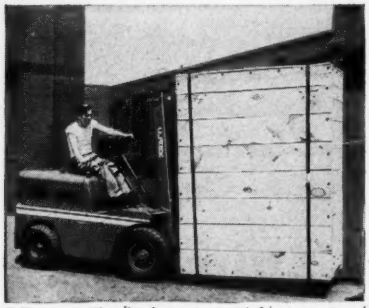
By speeding materials movement, it increases capacity to produce. By utilizing air rights, it expands warehouse capacity without expanding the warehouse. By faster loading and unloading, it reduces demurrage charges. Accidents are reduced. Damage losses approach the vanishing point.

50 lugs of cherries assembled on a skid on their way to the cannery—an easy load for the Clark electric battery-powered Carloader.

To tell and illustrate how businesses like yours are "cashing in with Clark's" is the function of "Materials Handling News." This unique magazine enjoys the largest circulation of any periodical concerned wholly with modern materials handling methods. A recent issue is of special value in that it "takes the Clark fork-lift truck apart"—to *show where and why it is a superior machine;* and why its users find that it is their best buy—that its proved quality makes it most economical to operate and to maintain.

A scoop attachment has many uses in handling bulk material. Here a Clark fork-lift truck with a scoop is shoveling corn into a conveyer that takes it to processing.

It is our pleasure to send this magazine to any business man who wants to read it. It will be mailed upon request—and will prove an effective "cost-less" way to CONSULT CLARK.



Bulky items like this box strapped for export are handled quickly and safely by the Clark Yardlift-40, pneumatic tired model designed for negotiating rough surfaces.

CLARK ELECTRIC AND GAS POWERED **FORK TRUCKS**
AND INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION, CLARK EQUIPMENT COMPANY, BATTLE CREEK 26, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD
AUTHORIZED CLARK INDUSTRIAL TRUCK SALES AND SERVICE STATIONS IN STRATEGIC LOCATIONS

MATERIAL HANDLING *News*®

LOOKING AT CLARK FROM ALL ANGLES

CLARK EQUIPMENT COMPANY, BATTLE CREEK 13, MICH.
☐ PLEASE SEND CURRENT ISSUE MATERIAL HANDLING NEWS

NAME

COMPANY

ADDRESS

CITY STATE

BRAINARD STRAPPING SYSTEM USED BY FORD MOTOR COMPANY TO HELP SOLVE UNUSUAL PACKAGING PROBLEM

WHEN the Ford Motor Company began producing semi-finished axles at their Canton, O., plant for shipment to Dearborn, Mich., for finishing and assembly, they discovered that because of the unusual design of the axles, special bundling and handling techniques were required.

Here is where the Brainard Strapping System entered the picture. Working with Ford's Canton shipping department, a plan was developed allowing rapid packaging and efficient shipping.

Brainard shipping specialists welcome the opportunity to study your shipping problems and recommend the most efficient method of strapping your shipments. And Brainard's complete control of material—from basic ore to finished product—assures users of the highest possible quality at the lowest possible cost.

SHARONSTEEL

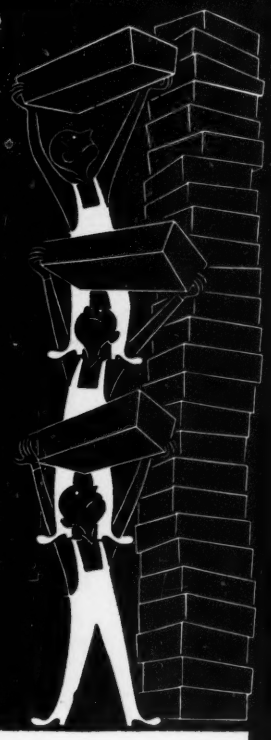
Faster — easier to use — the new STRAP-O-MATIC tensions, cuts and seals, all in a matter of seconds. STRAP-O-MATIC is designed by Brainard strapping specialists to do the job in three easy, natural motions. It is a production tool easily adapted to your present setup. Write for literature.

Brainard Steel Company

WARREN, OHIO — DEPT. F-39

NO! NO! NO!

GET A YALE TRUCK



High stacking material with Yale Trucks not only lowers your cost per ton of material handled—it doubles or even triples your floor space. With a Yale Electric High Lift Fork Truck, you can stack multiple units (not just one at a time) ceiling high, with no effort at all.

Yale Electrics run from 1,000 to 60,000 lbs. capacities, in models to fit your needs. Most complete line in the world.

Consult telephone directory for local Yale representative or, send for new Catalog K-T. The Yale & Towne Mfg. Co., Dept. K-1, Roosevelt Blvd., Phila. 15, Pa.

TOOLS THAT KEEP INDUSTRY "ON THE MOVE"

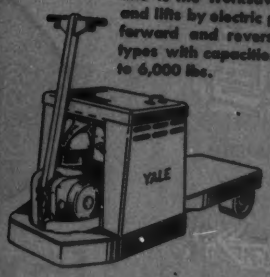
YALE

SCALES
HAND AND ELECTRIC HOISTS
HAND LIFT AND ELECTRIC TRUCKS

"ON THE MOVE" WITH YALE

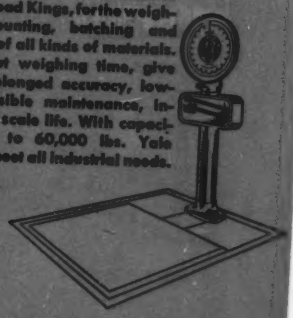
EXCLUSIVE AIR-COOLING DESIGN of the Yale Cable King Electric Hoist eliminates excessive brake heat; gives you more lifts per day. It is the only hoist equipped with a load brake with positive lubrication. ½ to 12 tons capacities.

NEWEST ADDITION to the Yale line is the Worksaver. It travels and lifts by electric power. Has 2 forward and reverse speeds. 10 types with capacities from 1,000 to 6,000 lbs.



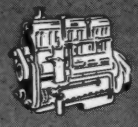
HANDLING MULTIPLE LOADS with less effort is routine for Yale Hand Lift Pallet Trucks. Wide range of models. Multi-stroke; mechanical and hydraulic lift. Capacities up to 6,000 lbs.

YALE OFFERS NEW SCALE LINE —The Load Kings, for the weighing, counting, batching and testing of all kinds of materials. They cut weighing time, give you prolonged accuracy, lowest possible maintenance, increased scale life. With capacities up to 60,000 lbs. Yale Scales meet all industrial needs.



Aeroquip

RAILROADS


ENGINES

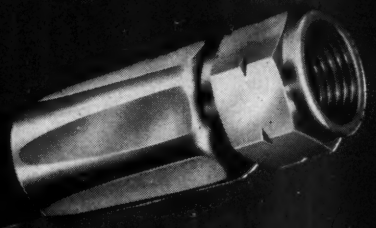
ROAD EQUIPMENT

HEAVY HIGHWAY EQUIPMENT

MARINE EQUIPMENT

BUSES

OIL FIELDS



FLEXIBLE HOSE LINES with DETACHABLE FITTINGS

Easily assembled in your own shop.

Operating temperatures from —40° to +275° F.

For use with hydraulic fluids, lubricating oils, water, air and many other fluids.

SELF-SEALING COUPLINGS

Allow separation and reconnection of fluid-carrying lines without loss of fluids or inclusion of air. 1 coupling takes the place of 2 hand-operated valves.

Aeroquip for Better Performance, Maintenance and Service

AEROQUIP CORPORATION

JACKSON, MICHIGAN

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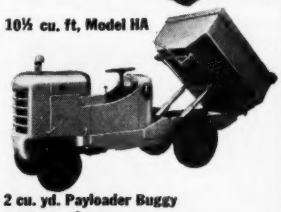
Aeroquip Products are Fully Protected by Patents in U. S. A. and Abroad

What's Your Bulk Handling Problem?

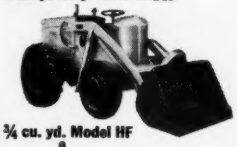
Coke • Coal • Cinders
Scrap • Sand • Clay • Slag
Chemicals • Waste
Sawdust • Lime • Abrasives • Stone • Sulphur
Cement • Fertilizer
Ore • Gravel • Brick
Tile • Cullet • Pigments
Salt • Sugar • Flue Dust
Soap • Peanuts
Dried Fruit • Snow
Barrels • Bales

Unload and Load Box Cars—Carry—Load Trucks, Cars—Charge Hoppers—Fill Bins

10½ cu. ft, Model HA

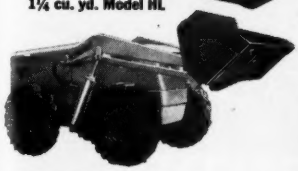


2 cu. yd. Payloader Buggy



¾ cu. yd. Model HF

1¼ cu. yd. Model HL



1½ cu. yd. Model HM

Bulk materials of any kind can become bottlenecks in any plant. They can also "hog" valuable floor space and discourage good plant housekeeping. Makeshift handling methods result in fatigue and physical injuries . . . slow down your operations and raise the cost of your production.

Hough PAYLOADERS are *designed* and built to provide a fast, flexible materials handling system . . . to cut time and costs . . . to boost output per manhour. PAYLOADERS are equipped to increase your production area by reducing your present storage space — to handle the largest loads per operation — to bring neatness into your plant. It's easy to pick up full loads of any bulk material with a PAYLOADER. It's easy to load your materials into hoppers or bins — high or low — by means of its quiet and dust-reducing hydraulic dumping mechanism.

PAYLOADERS also pay an extra bonus by doing many odd chores . . . pushing, pulling, lifting, spotting cars, loading and plowing snow, cleaning yards, leveling waste dumps and grading.

FREE LITERATURE
on any units of the complete PAYLOADER line is yours for the asking.

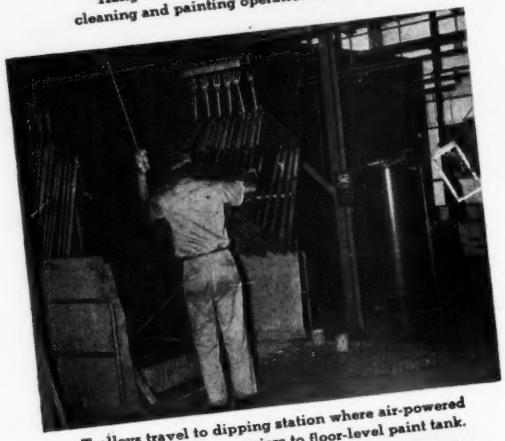
PAYLOADERS are dependable — because they are the result of materials handling experience since 1920.

The Frank G. Hough Co., 731 Sunnyside Avenue
Libertyville, Illinois

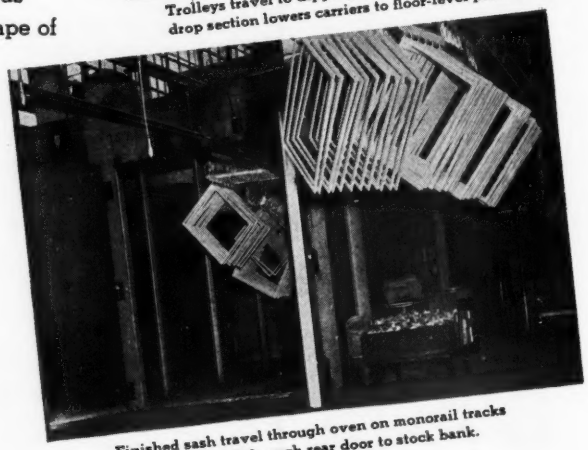
HOUGH
PAYLOADER
Manufactured by THE FRANK G. HOUGH CO.

Storm Sash on Mass Production with AMERICAN MONORAIL

"Hang-on" station with upper level track over the cleaning and painting operations shown in background.



Trolleys travel to dipping station where air-powered drop section lowers carriers to floor-level paint tank.



Finished sash travel through oven on monorail tracks which extend through rear door to stock bank.

• A well-known manufacturer of steel office furniture has successfully undertaken mass production of screen and storm sash. A continuously operated finishing department, with a capacity of 80 storm sash and component parts per hour, is made possible by a 300 foot manually operated American MonoRail Overhead Handling System. Of a staff of 60 personnel, only 5 are required in the finishing department. The American MonoRail system transports all the pieces from cleaning and priming tanks to paint dipping vats to ovens to storage. Manual operation was chosen because of the diversity in size and shape of the pieces being finished.

From the simplest hand-operated unit to the most complicated fully automatic system. American MonoRail engineers can suggest a system best suited to **YOUR** problems.

SEND FOR BULLETIN C-1, a 56-page book showing successful applications of American MonoRail Systems.

THE AMERICAN MONORAIL COMPANY

13129 ATHENS AVENUE **CLEVELAND 7, OHIO**

New FAIRBANKS *Series "21"* Caster has *NO King-Pin!*

KING-PIN Construction

Revolutionary "LOCK-WELD" Construction removes the *cause* of most caster failures

Look at the Difference!

between the king-pin and "LOCK-WELD" construction, after extensive laboratory and use tests under widely varying floor conditions!

FAIRBANKS SERIES "21" Swivel Caster "LOCK-WELD" CONSTRUCTION

For as long as most of us can remember, the king-pin has been the cause of most caster failures. Now, Fairbanks has licked the problem!

As a result of numerous designs and models tested, Fairbanks has developed the Series "21" — a pressed steel swivel caster with the unique "LOCK-WELD" construction. This revolutionary construction eliminates the king-pin and locks the curved top of the fork between the top and retaining plate so that the ball race sections remain properly aligned, even under excessive overloads. *Proper alignment assures easy swiveling.*

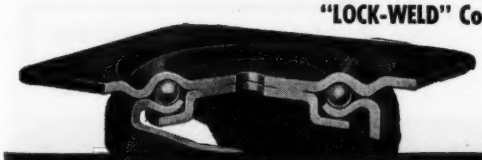
Fork design of the Fairbanks Series "21" Swivel Caster has been scientifically engineered to eliminate distortion under conditions of overload and shock. A series of arches built into the legs affords maximum dispersion of direct and thrust loads over the entire ball race — there's a purpose to every twist.

SWIVEL AND RIGID TYPES

Fairbanks Series "31" Rigid Casters have the same overall heights as the Series "21" Swivel Casters. Wheels are available in several types: semi-steel with plain or roller bearings; solid rubber with oilless bearings; vulcanized rubber with roller bearings; plastic with plain or roller bearings.

For truly longer-lasting casters, specify Fairbanks Casters. Use coupon or write for free bulletin describing this latest improved line of casters. The Fairbanks Company, 393 Lafayette St., New York 3, N. Y.; 520 Atlantic Ave., Boston 10, Mass.; 15 Ferry St., Pittsburgh 22, Pa.; 202 Division St., Rome, Ga.

Cutaway view of "LOCK-WELD" Construction



fairbanks COMPANY

The Fairbanks Company, Dept. A
393 Lafayette St.
New York 3, N. Y.

Please send me the free Bulletin 21-31

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

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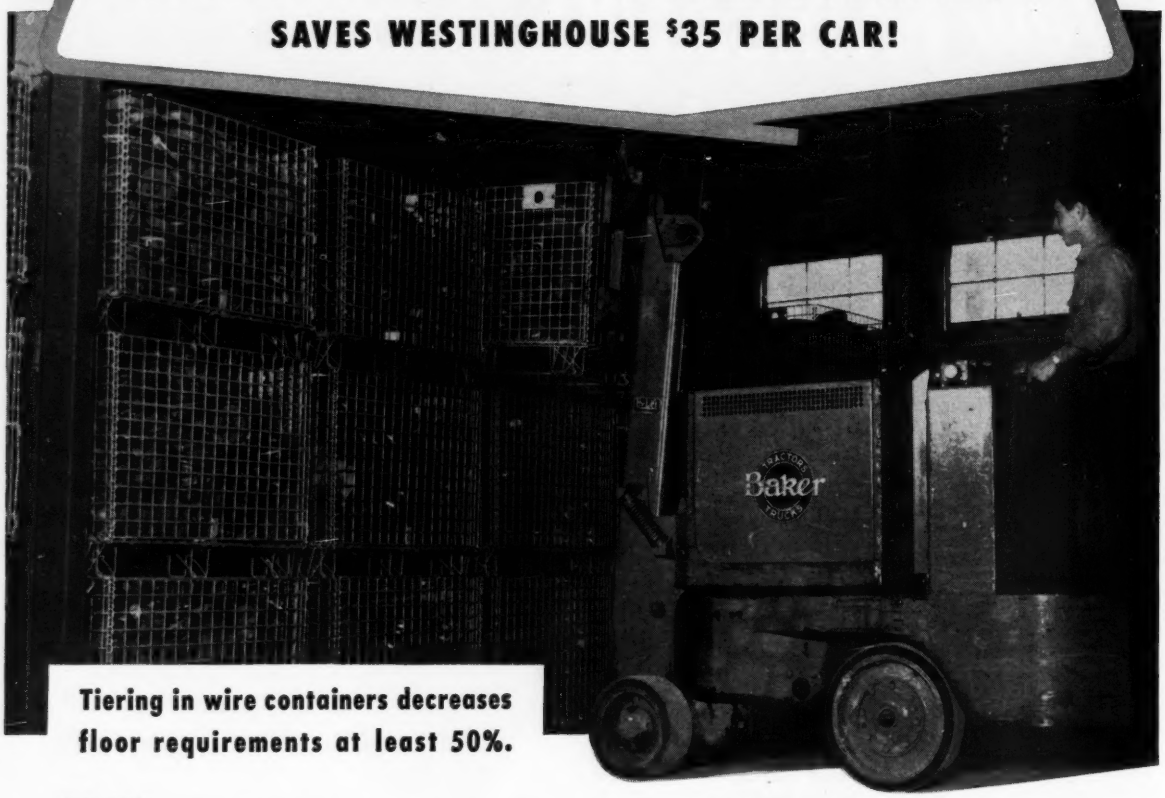
UNLOADING CASTINGS WITH *BAKER TRUCK* SAVES WESTINGHOUSE $35 PER CAR!



Tiering in wire containers decreases floor requirements at least 50%.

BAKER Articulated Fork Trucks, used with collapsible wire containers, have reduced a 48 hour unloading operation to 3½ hours. Bracket castings formerly arrived at the Lima Westinghouse plant piled loose in the car, were placed in rigid skid boxes, one at a time, carried to storage, and piled, one at a time in wooden bins. When needed, they were again placed in skid boxes, one at a time, and taken to production.

Today they arrive from the foundry in the wire containers. The Baker Truck unloads, stores, and carries them to production *in the same containers.* Empty containers are collapsed and returned to supplier.

Additional benefits are

1. **Easier handling for supplier.**
2. **Demurrage on carriers eliminated.**
3. **Breakage at receiving end eliminated.**
4. **Floor storage requirements cut 50%.**
5. **Inventory taking in storage facilitated.**
6. **Production speeded by**
   - **a. Avoiding delays in delivery of work.**
   - **b. Work positioned to minimize re-handling.**
   - **c. Cutting waiting time between jobs.**

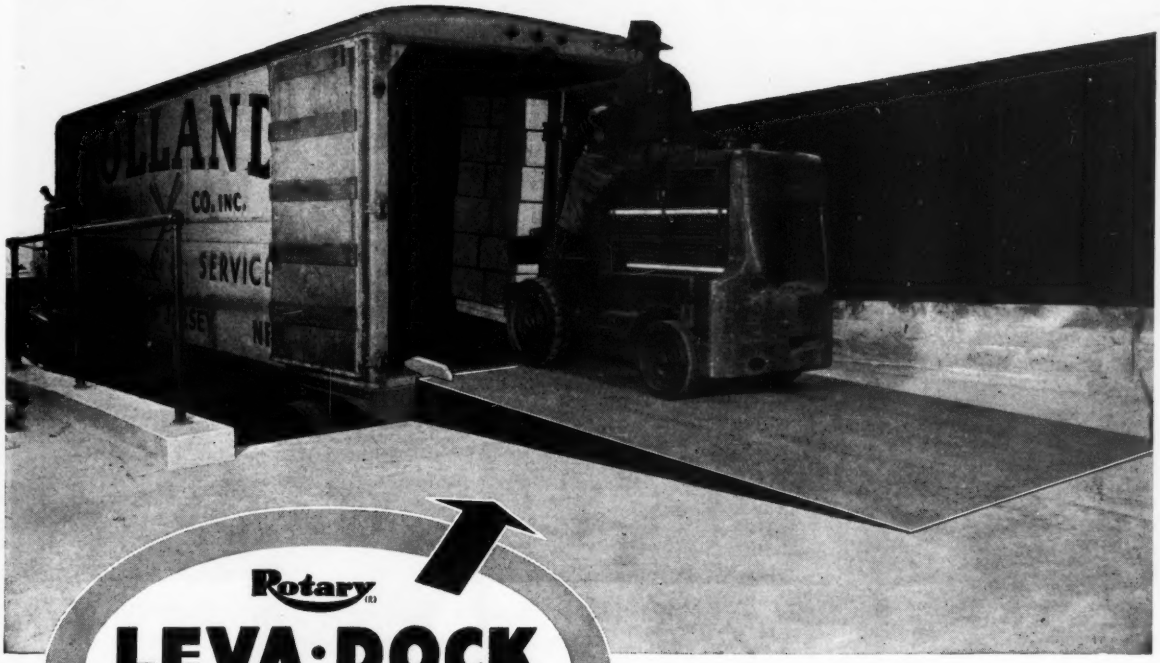
The Baker Articulated Truck is ideally suited to this plant's needs, since it operates without difficulty in narrow aisles in storage, and in congested areas in production departments.

BAKER INDUSTRIAL TRUCK DIVISION *of The Baker-Raulang Company*
2185 West 25th Street • Cleveland 13, Ohio
In Canada: Railway and Power Engineering Corporation, Ltd.

Let the Baker Material Handling Engineer show you how you can make similar savings.

Baker INDUSTRIAL TRUCKS

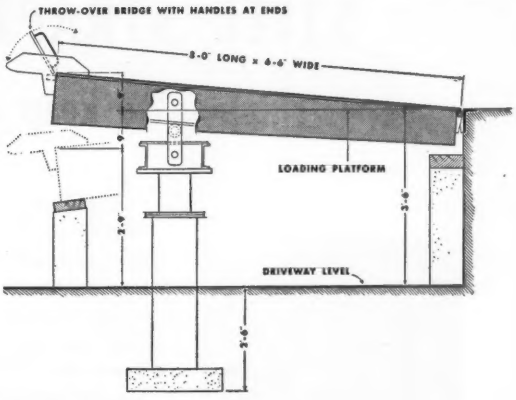
NEW WAY TO LOAD TRUCKS FAST



Rotary®

LEVA·DOCK

ADJUSTABLE RAMP
FOR LOADING DOCKS



The Leva-Dock moves up and down with varying truck bed levels—permits loading directly into trucks or trailers

Loading and unloading trucks and trailers presents a tough loading dock problem because (1) truck bed heights vary as much as 12 inches, and (2) the truck bed moves down or up as loading and unloading progresses. This problem has been made very serious by the use of power vehicles handling heavy loads.

The Leva-Dock makes it possible to load directly into or unload from all types of trucks or trailers . . . without using steel plates, bridge ramps, or other slow and frequently dangerous methods. It is being used by leaders in industry, and has been approved by architects and engineers as one of the most practical pieces of building equipment developed in recent years. Installation is simple and inexpensive.

ROTARY LIFT CO.

1003 Kansas, Memphis 2, Tenn.

MAIL COUPON FOR COMPLETE DATA →

How the Leva-Dock Operates

The Leva-Dock is a hinged platform with hydraulic jack. With front end of the Leva-Dock platform raised, the truck or trailer is backed into position for unloading or loading. Then the Leva-Dock platform is lowered until the heavy supporting arms rest on the truck or trailer floor. The gap between the Leva-Dock and the vehicle is bridged by a steel "throw-over" bridge. The hydraulic system is then released so that the front end of the platform is free to travel up or down with the truck bed as truck springs are relieved or compressed during loading and unloading.

Rotary Lift Co., 1003 Kansas, Memphis 2, Tenn.

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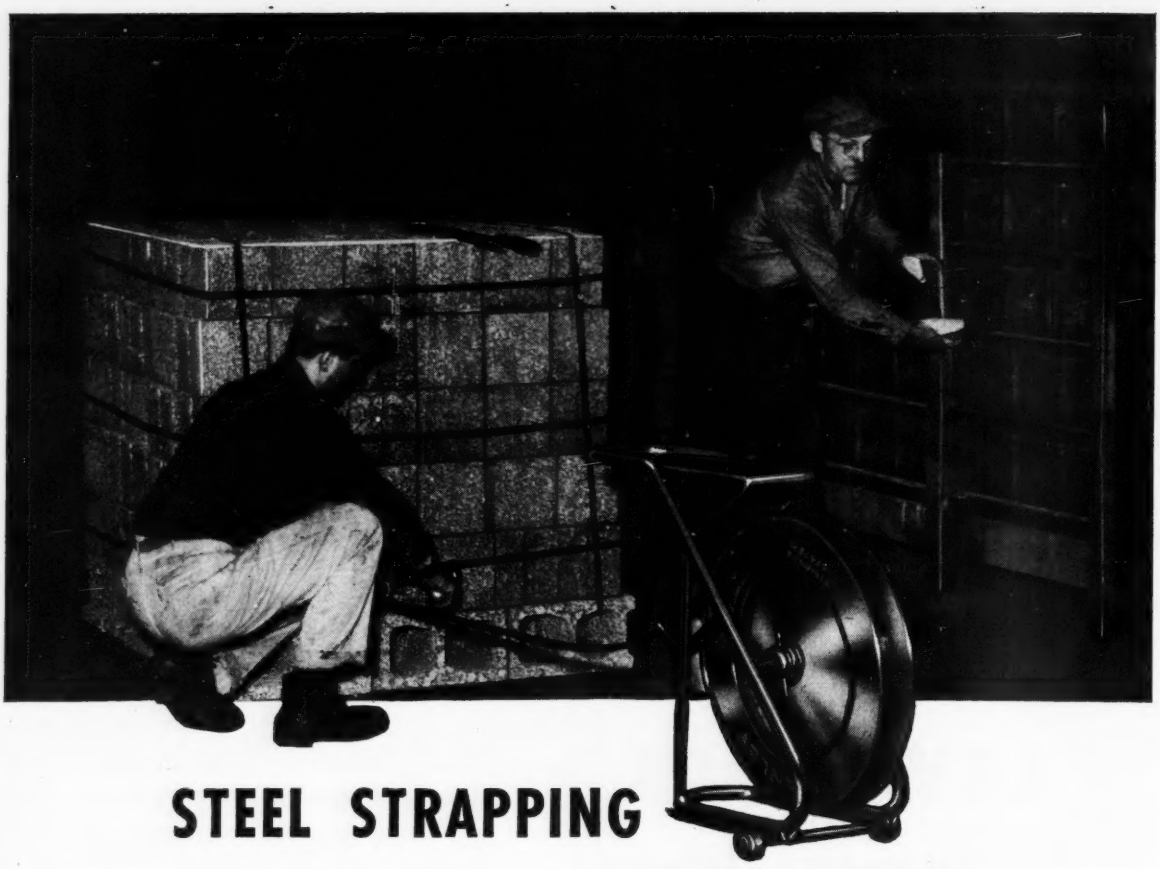
City & State.....



STEEL STRAPPING

speeds shipping to keep pace with faster production

The Plasticrete Corp., Hamden, Conn., cinder block manufacturers, stepped up production and then came face-to-face with a shipping bottleneck. Machines turned out 720 blocks an hour instead of 600. Fork trucks were rigged to handle two pallets of blocks instead of one. A 2-cycle curing process was evolved. But this faster flow called for faster handling and shipping. As so many other users of Stanley Steel Strapping have discovered, Plasticrete found that the quickest, cheapest, safest way to handle this faster production flow was to tie "cubes" of blocks together vertically and horizontally into easily, economically shipped units.

Another packaging, shipping accomplishment for the Stanley Steel Strapping System. Your product probably can be shipped at a big saving in handling and shipping costs with the help of Stanley Steel Strapping. Write for full information on the complete line . . . reels, tools, accessories. The Stanley Works, Steel Strapping Division, 203 Lake St., New Britain, Connecticut.

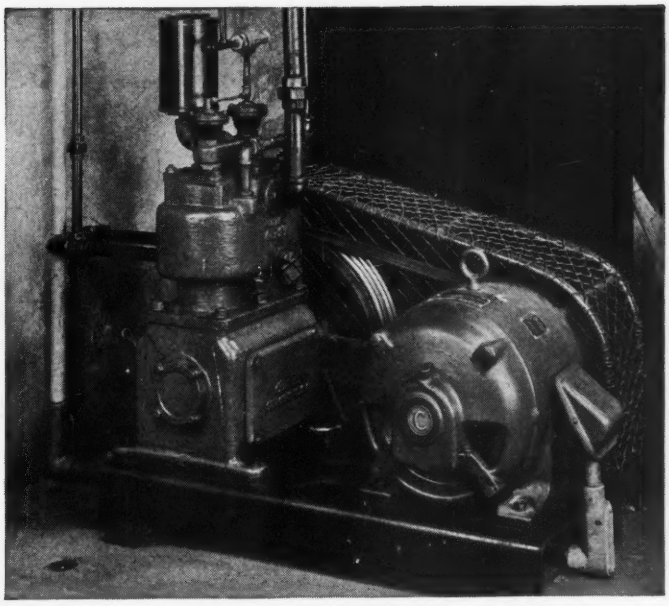
STEEL STRAPPING AND CAR BANDING SYSTEMS

STANLEY

Reg. U.S. Pat. Off.

HARDWARE • HAND TOOLS • ELECTRIC TOOLS • STEEL STRAPPING

Curtis Timken Bearing Air Compressor. Sizes from ¼ to 50 H. P., inclusive.



RELIABILITY
That Pays Off in Low-Cost Performance

CURTIS TIMKEN BEARING AIR COMPRESSORS

WHATEVER the application, in thousands of varied industrial installations, Curtis Timken Bearing Equipped Air Compressors have a long and proven record of extreme reliability, low maintenance expense and unusually long life.

Every Curtis Air Compressor has been carefully engineered, made of the highest quality materials and precision built throughout.

Their dependable, economical performance is the result of such design advantages as:

- Timken Roller Bearings
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- Carbon-Free Disc Valves
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- Precision Construction

Specify CURTIS when you want a reliable, low-cost supply of air for *any* use. Capacities from ¼ to 50 H.P. (up to 300 CFM).

Curtis Timken Bearing Air Compressor with tank. Sizes from ¼ to 10 H.P., inclusive.

Write today for full information on Curtis Air Compressors, Air Hoists and Air Cylinders—or mail the coupon below.

I-48-1

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PNEUMATIC MACHINERY DIVISION
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95 Years of Precision Manufacturing

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Please send me Form C-7 on Curtis Air Hoists, Air Cylinders and Curtis Air Compressors.

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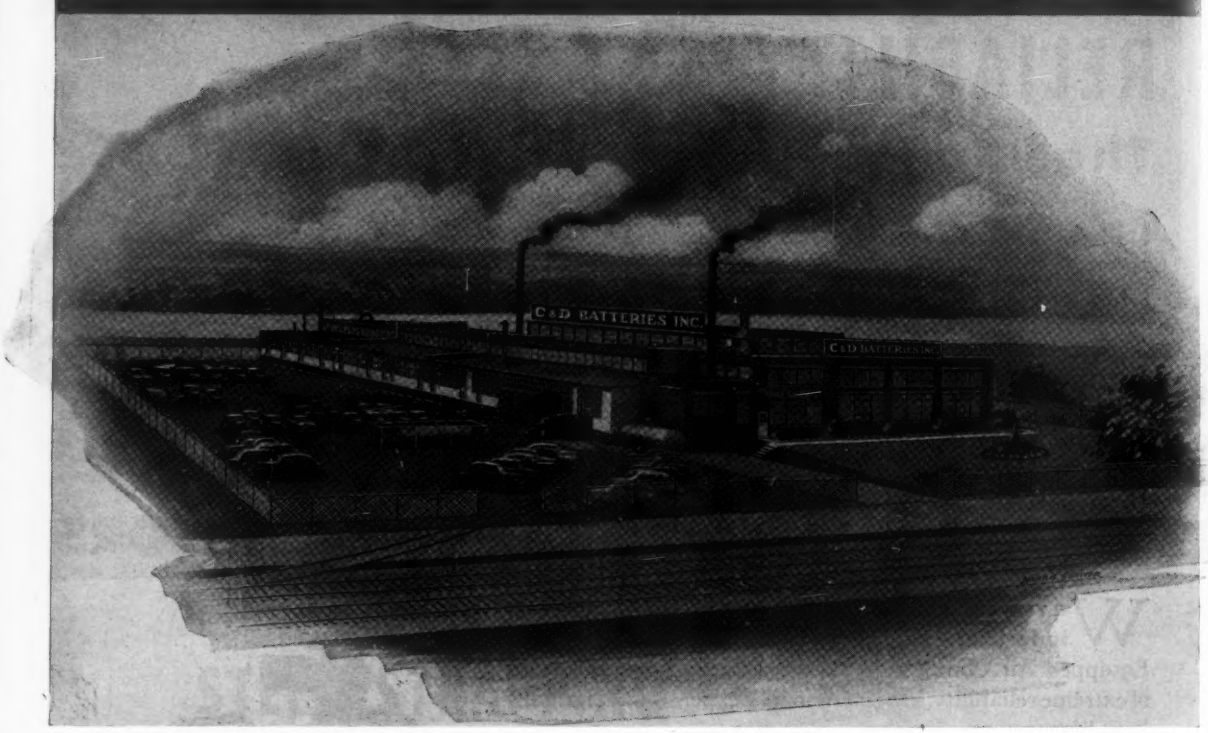
HOME OF Five-Fold *Slyver-Clad* BATTERIES



C & D's streamlined plant and laboratories (expanded 120%) are operated by an executive and supervisory force with an average of 26 years' service with the C & D organization.

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540 A.H.

Slyver . . .

. . . is a revolutionary C & D development. Thick layers of infinitely fine glass fibres (.00025 inch average diameter) are laid parallel in a vertical position against the power-producing material in C & D's 30% heavier positive grid plate.

- **Increases work-life 35% . . . at NO EXTRA COST!**
- **Assures 20% EXTRA K.W.H. capacity!**
- **Efficient, dependable, low-cost performance!**
- **Backed by C & D ZONE SERVICE for both charging equipment and batteries!**

C&D BATTERIES, INC.

TELEPHONE · DIESEL · ELECTRIC INDUSTRIAL TRUCK · LOCOMOTIVE · STARTING & LIGHTING

Established 1906 **of Conshohocken, Pa.** SALES AND SERVICE IN PRINCIPAL CITIES

LET'S KEEP OUR GAINS

By W. A. PATTERSON, President
United Airlines, Inc.

THE present hue and cry over real and imagined threats of subversive elements to the safety, security and established order of the United States must not be allowed to obscure the big responsibility which we have to keep our own house in order. Gains which we have made in strengthening our system of private enterprise must not be lost. Further advancements must be expected.

It was largely the ingenuity and productivity of our free enterprise system which won the war. The same features of our American way of doing things should constitute the best guard against any pestilences which may creep in from abroad.

Partners in the system of private enterprise are stockholders, management, employees and patrons. Honesty and sincerity must be the basis for their ventures, large or small. Frank dealings and a free exchange of information between all parties is a major requirement.

It is because business so often has aroused suspicion on the part of stockholders, employees and customers that it has permitted politicians and factional leaders to pick up the popular banner called "social gain." Such was one reason that business forfeited so many of its prerogatives to government—prerogatives which it is only just beginning to re-gain.

Realistic efforts on the part of all business and industry to strengthen and preserve our system of free enterprise, chiefly through recognition of their social and economic responsibilities, will do far more to spike subversive threats than all the Communist hunts now under way. Without such efforts, we might as well concede victory to the "isms"—and let the atom bomb do the rest.

There have been healthy signs of a resurgence of social consciousness on the part of business; of more intelligence on the part of management and labor in their approach to mutual problems; of a relaxation of the government's tendency to run everyone and everything; of a growing consciousness on the part of the public generally as to what should constitute a sound and secure America.

We can hope that these trends will continue and that private enterprise will become an increasingly strong bulwark against those who might wish to step in and run our household for us.

$2400 INVESTMENT RETURNS $8300

This paper won first prize of $500 in the 1948 FLOW Cost Analysis Contest. As production in this plant increased, the loads became too heavy, the cost too high for profitable production. Following an analysis, labor-aiding equipment was added.

By PAUL J. MacCUTCHEON, JR.
Chief Industrial Engineer
Peter Cailler Kohler Swiss Chocolate Co., Inc.
Fulton, N. Y.

A SUBSTANTIAL portion of our total finished goods production originates in a packaging department (hereafter referred to as the Department), which is some 700 feet from our warehouse. This production consists of: 1. Cases of from 12 to 52 lbs. net weight. 2. Multi-wall paper bags, 100 lbs. net weight. 3. Fibre drums, 100 lbs. net weight.

These items must be transported from the Department to the warehouse for storage, pending order assembly and subsequent shipping. This paper deals with the operations of transporting the finished goods to the warehouse and storing them there. The Department operates 17 hours a day, approximately 300 days per year.

The Old Method

The various items were stacked on 4-wheel hand trucks placed at the ends of the production lines. The loads varied from 800 to 1000 lbs., depending on the item. Each completed load was pushed 700 feet to the warehouse, where it was left in a designated area. The warehouse crew propelled the loaded units to the storage areas, then unloaded and stacked the cases, bags and drums, and returned the empty trucks to the point where the Department operators would pick them up.

Feasible while the Department was small, this method became increasingly unsatisfactory as production grew. By 1946 it was costing us some $17,000 per year. Obviously, the volume had grown beyond the capacity of muscle power, and called for labor-aiding machine power if a cost reduction was to be effected.

A general palletization program in our warehouse gave the impetus for finding a method of doing the job more economically and with less back-breaking effort, a method that would tie in with the palletized operation. A systematic search for a better method was begun.

Alternatives Considered

Install a belt conveyor between the Department and the warehouse. This was turned down because of two reasons: 1. Several buildings between the departments. 2. Lack of room in the Department for the sub-conveyors to feed from the production lines to the main belt.

The second alternative was to stack the production on pallets and use standard fork trucks to transport the loads from the Department to the warehouse, and tier them there. This was a perfectly feasible solution except for one point—and this could not be remedied at any reasonable cost. The floors along the major portion of the route were of a type of construction which could not support the weight of a fork truck and load—unless we wanted to bite into the design safety factor. This we did not want to do.

Pallet handling "walkies" were eliminated because of the 700-foot haul. The third alternative was to stack the production on pallets, transport the loads to the warehouse on a light-weight power truck operating at a reasonable speed, and pick them up there and tier them with standard battery powered fork trucks. (The warehouse floors have ample load capacity for fork truck operation.)

The only difficulty here was that (at the time) there were no lightweight power trucks available which would pick up a pallet load and transport it at a reasonable speed over not-too-smooth floors.

Method three was adopted (with modifications), as described in the following section.

The New Method

An effective solution was worked out as follows.

We purchased two light-weight low lift power trucks, driven by single-cylinder air-cooled engines (900 lbs. without load). These trucks with a load of 1000 lbs. would not overload the weak floors on the route; these units distribute the load over a five-foot wheel base. The low-slung bed is designed to pick up a skid with an 8″ underclearance.

We transported 75 of our standard skids to the operation, plus a pool of about 75 pallets. A pallet-bearing skid is placed at the end of each promotion line. Cases, bags and drums are piled on the pallet, using a specific stacking pattern for each item. A finished load weighs from 700 to 1000 lbs., depending on the item.

The truck operator picks up the pallet-bearing skid and transports it to the drop area in the warehouse. While some of the return trips are made without a load by the trucks, empties are delivered whenever

TABLE A.

Summary of Savings

1. Direct labor cost—old method	$16,958 per year
2. Direct labor cost—new method	7,123 per year
Direct labor savings	9,835 per year
3. Less: Operating Expense	1,495 per year
NET SAVINGS PER YEAR	$ 8,340

TABLE B.

Detail of Direct Labor Cost—Old Method

1. Push truckload of finished cases from Department to warehouse, pick up empty truck and push back to Department ---------- .027 hrs. per 100 lbs.

2. Push loaded truck to storage stack in warehouse, unload cases and stack, and return empty truck to pick-up point for Operation #1---- .023 hrs. per 100 lbs.

TOTAL HOURS PER 100 LBS.--- .050

3. Total 1947 volume handled in this operation was 28,988,624 lbs.

$$\frac{28{,}988{,}624 \text{ lbs.}}{100} \times .050 \text{ hrs. per 100 lbs.} = 14{,}494 \text{ hrs. per year}$$

4. 14,494 hrs. × $1.17 (average hourly rate) = $16,958 cost per yr.

NOTE: The time values stated in Steps 1 and 2 were obtained from our cost system. Total hours spent on these operations in 1946 were divided by total pounds (net product weight) handled to arrive at cost in terms of hours per 100 pounds.

TABLE C.

Detail of Direct Labor Cost—New Method

1. Using power truck, pick up pallet load (on skid) of finished cases in Department and transport to warehouse. Pick up empty skids and pallets and transport back to Department---------- .139 hrs. per load

2. Using high-lift fork truck, pick up pallet load from skid, transport to storage stack and place in storage. Return to pick-up point. Stack skids for pick-up by power trucker. Place 8 empty pallets on skid as required to supply the operation ---------- .038 hrs. per load

TOTAL HOURS PER PALLET LOAD .177

3. Net weight of product per pallet load varies from 720 to 1,000 lbs., depending on the item. Total 1947 volume handled in this operation was 28,988,624 lbs. Dividing this by 34,921 total pallet loads in 1947 yields an average product weight per pallet of 830 lbs.

4. $\frac{.177 \text{ hrs. per load}}{830 \text{ lbs. per load}} \times 100 = .021 \text{ hrs. per 100 lbs.}$

5. $\frac{28{,}988{,}624 \text{ lbs.}}{100} \times .021 \text{ hrs. per 100 lbs.} = 6{,}088 \text{ hrs. per year}$

6. 6,088 hrs. × $1.17 (average hourly rate) = $7,123 cost per year.

NOTE: The time values stated in Steps 1 and 2 are standard times currently in use for payment of the operations described.

they have been accumulated. A load of empties usually consists of six stacked skids or eight pallets on a skid. These are delivered to areas adjacent to the production lines in the Department.

In the warehouse, an operator with a standard high lift fork truck picks off the pallet loads and tiers them in the assigned storage area. This operator stacks the empty skids in the drop area and also draws empty pallets from warehouse stock for pick-up by the low lift truck.

Savings and Advantages

Our total investment in gasoline trucks, skids and pallets for the operation is $2403. (Fork truck capacity was available in the warehouse without purchasing additional units). After deducting all operating expenses (see Table D) we show a net saving of $8,340 per year.

Two important non-financial advantages have accrued. 1. Elimination of manual pushing of truck loads and manual stacking of the production in the warehouse. Both heavy jobs and well done away with! 2. Reduction of congestion along the trucking route. The power trucks travel at 4.5 miles per hour. about twice the speed of physical propulsion.

Methods of Cost Analysis

Labor Cost—Old Method. Our cost accounting system is set up to accumulate manhour charges for specific operations, where time standards for the operations have not been established. Total hours spent on these operations in 1946 were divided by total pounds of product to arrive at a cost in terms of manhours per 100 pounds. See Table B.

Labor Cost—New Method. These operations have been time studied and direct standards set. Standard time per load for the operations has been converted to a time per 100 lbs. of product, using the weighted average pallet load for 1947. This puts the figures on the same basis as those developed for the Old Method. See Table C.

Investment. The dollar costs quoted for each item of equipment have been obtained from our General Accounting Departments.

Interest. Our standard policy in estimating savings is to assume an interest charge of 6% on the money invested in equipment.

Depreciation. Rates vary with the nature of the equipment. Those used reflect company accounting policy. See Table E.

Other Expense Charges. Repair, maintenance, power, and gasoline comprise the remainder of the expense chargeable to the operation. See table E for details of the computations.

Note: No savings credit is taken for the 4-wheel hand trucks retired by the new method. They were old, almost fully depreciated, and were not considered saleable.

TABLE D.

Summary of Operating Expenses Other Than Direct Labor
(All figures are dollars per year)

	Gas Trucks	Pallets	Skids	Fork Trucks	TOTAL
1. Interest on investment	83	10	52	96	241
2. Depreciation	276	55	86	107	524
3. Power and Gasoline	335	—	—	21	356
4. Repair and Maintenance	357	—	—	17	374

TOTAL OPERATING EXPENSE PER YEAR EXCLUSIVE OF DIRECT LABOR $1,495

TABLE E.

Detail of Operating Expense

1. Two gasoline powered skid lift trucks

Total purchase price ..... $1,380.

a. Interest on investment—6% ..... $ 83 per year

b. Depreciation ..... 276 per year
5 year basis = 20% per year.

c. Gasoline ..... 335 per year
1397 gallons @ 24c.
Gasoline for this service is not metered separately. Time studies on this operation established an average usage of one gallon per 25 trips.
34,921 trips in 1947 / 25 trips per gallon = 1,397 gallons.

d. Repair and Maintenance ..... 357 per year
These trucks are serviced by an outside organization. Total bill for 1947 was $356.78.

2. Pallets

About 75 of our standard pallets are necessary to supply this operation. They are double faced, hardwood construction, 36" x 42". Cost is $2.19 per pallet.
75 × $2.19 = $164.

a. Interest on investment—6% ..... $ 10 per year

b. Depreciation ..... 55 per year
3 year basis = 33⅓% per year.
Repair and maintenance is not carried as a pallet expense charge. The depreciation rate used reflects the relatively short service life.

3. Skids

75 metal leg skids (wood platform, iron bound) are used in the operation. Our original cost is $11.45 per skid.
75 × $11.45 = $859.

a. Interest on investment—6% ..... $ 52 per year

b. Depreciation ..... 86 per year
10 year basis = 10% per year.
These have a much longer service life than pallets. Repairs are so seldom needed that we do not carry such a charge.

4. Fork Trucks

Total purchase price: Two 2000 lb. high lift fork trucks, four batteries, and two chargers $12,304

a. Interest on investment ..... $ 96 per year
$12,304 × 6% × 13%

b. Depreciation ..... 107 per year
15 year basis. $12,304 × 6.67% × 13%

c. Power ..... 21 per year
Input to a charger is 16.5 KWHr. per shift.
2 chargers × 600 shifts × 16.5 KWHr. × $.008 per KWHr. × 13%

d. Repair and Maintenance ..... 17 per year
Repair cost is nil. Maintenance involves 4 man hours of servicing per truck per month.
4 hours × $1.40 per Maintenance Man-Hr. × 2 trucks × 12 mos. × 13%.

Two 2000 lb. high lift, battery powered, fork trucks are used on a variety of warehouse operations, including that described in this paper (new method).

The operation with which we are concerned is only one of several done by these trucks. Therefore, only a portion of the operating expense of these trucks is chargeable to this operation. The most equitable means of making this allocation is ratio of production handled in this operation to total production. The 1947 production figures show that the poundage handled from the Department amounted to 26% of total production into the warehouse.

A further point: We are concerned in this paper only with getting the production **into** storage. These same two fork trucks later remove the product from the storage tier and deliver it to load assembly areas. Standard time for this "second operation" is about equal to that for getting the product into storage. The 26% allocation factor will therefore be divided by two, yielding a final figure of 13%. This figure is used above in determining the cost allocation of each of the four items of fork truck expense.

This gas-powered truck delivers to warehouse from production.

This battery-powered truck stacks finished products in warehouse.

Looking down one of the busy aisles between exhibit booths.

The Third National Material Handling Exposition is . . .

The Greatest So Far

The Third Material Handling Exposition has come and gone and to some 17,000 registrants who crowded Philadelphia's Convention Hall, it was a show that will be long remembered. Approximately 250 exhibits made this convention the largest material handling show thus far, and established it as one of the largest industrial expositions in the country.

17,000 registrants helped boost third National Material Handling Exposition to top place among U. S. industrial shows.

THE range of the exhibits told part of the great expansion that has come about in the industry in recent times. Featured were items ranging from gum tape dispensers and packaging supplies to giant lumber carriers and towering mobile cranes. In between were scores of exhibits showing the latest models of fork trucks, hand lift trucks, conveyors and other rolling equipment. Metal, wood, and paper pallets were featured. Working models of monorail equipment and overhead traveling cranes drew large crowds. Steel strapping, stenciling machines, paper fiberboard, and wooden shipping containers were exhibited. Positioners, feeding tables, a diesel-electric locomotive, casters, industrial wheels and

Some Technological and Design Innovations Observed at the Show

Fluid Drive

An automotive type fluid drive unit has been incorporated in a new line of gas industrial trucks. This is a new wrinkle in gas truck design. It eliminates the operation of clutch and gear shift levers and makes possible smoother transitions from slow to fast speeds.

The cushioning effect derived from the oil body that is used as the contact surface between the driving and driven ends of the power shaft, permits smooth transfer of power from motor to wheels. This reduces load vibration, eliminates wear on mechanical parts and helps increase tire life. A fluid drive unit of the same type was introduced on passenger automobiles several years ago.

Magnetic Induction Drive

Another innovation in industrial trucks is the magnetic induction type drive which eliminates the conventional clutch. It is designed to instantaneous reversal of direction, stop wheel slippage and prevent stalling.

The "heart" of this drive unit is a magnetic coil and rotor arrangement mounted on the drive shaft—the driving (magnetic) coil is on the flywheel and the driven rotor is on the transmission shaft. There is no contact between the two surfaces and the magnetic inductive or "holding' force is applied through an air gap. Two sets of coils and rotors are used, one set for forward motion and the other for reverse.

A simple switch-lever on the steering column is all that is used for control. Flipping it forward produces forward motion while flipping it back will reverse direction of travel. The speed of the truck is unimportant, for just the mere movement of this switch will bring the truck to a smooth stop and quickly reverse its direction. During this procedure, accelerator pedal pressure can remain constant but if slow or "inching" speeds are desired a special pedal near the steering column provides this by varying the voltage to the flywheel coils.

Driverless Truck

A driverless remotely controlled fork truck, assembled especially for this show, served as a preview of possible future developments in the science of material handling. The unit, controlled by a ray, performed a typical routine of pick-up, carry, raise and stack, such as encountered in any warehouse or factory. During this entire operation, the truck was untouched directly, it was controlled indirectly by an operator at a switch-panel located at some distance. Its effortless, efficient operation certainly "opened-the-eyes" of many to just how far technology can advance in the relief of muscular exertion by men.

Flexible Monorail Suspension

Broader application of the efficient ball-and-socket overhead track suspension to monorails and cranes was also in evidence. This design, incorporating a ball-and-socket suspension unit at both ends of each supporting rod, eliminates distortion on these rods and evenly distributes the load being carried. This is said to contribute to ease of movement on straight or curved track sections, as the rail itself is able to rock with any swaying or vibrating load and the trolley wheels are evenly loaded no matter what their position in relation to perpendicular suspension.

"Crawler" Hand Truck

The conventional two-wheel hand truck has been made more efficient for loaded operations on stairways by the addition of a caterpillar or "crawler" tread. This tread is a continuous strip of rubber traveling over rollers mounted in a metal frame. With this frame of sufficient length to span several steps, a "crawling" motion is obtained, distributing the load evenly from step to step and preventing slipping or bumping. For floor or level operation a pair of conventional wheels are attached to the truck frame just forward of the caterpillar treads.

scales account for only a part of the wide range of items.

Visitors From All Over

Visitors and exhibitors came from all parts of the country and abroad. Conventioners included industrial engineering students and teachers —some schools required students to attend. In addition to the exhibits, visitors saw many technical moving pictures in the material handling theatre. They ran continually from the show's opening until its closing, and featured topics ranging from mechanization in a foundry and the manufacturing of chain to fork truck operations and the conveyorized transportation of gravel and dirt over the countryside. Many films were shown for the first time.

Educational Program

One of the highlights of the show was the material handling conference jointly sponsored by the Material Handling Institute and the ASME.

The program included talks on the following subjects: Outlook for the Industry, by Dr. Charles F. Roos, president of the Econometric Institute, Inc.; Opportunities for Sales Engineering, Ezra W. Clark, business counsellor; The User Talks to the Sales Engineer, by T. O. English, assistant general purchasing agent, Aluminum Co. of America, Pittsburgh. These papers covered the outlook for the material handling industry, stressing how it can provide addiitonal economies for user plants.

First Cost Analysis Contest prize winner P. J. MacCutcheon Jr., left, receives $500 check in FLOW booth from Publisher I. B. Hexter.

The Economics of Materials Handling, given by Stevens H. Hammond, president of The Whiting Corp., discussed material handling from the management point of view. T. L. Carter, in his talk, The Material Handling Engineer, pointed out the engineer's requirements, his relation to other departments, and his duties and responsibilities. The Importance of Material Handling was presented by Curtis H. Barker, Jr. general chairman of the conference.

H. B. Maynard, president of Methods Engineering Council, talked on Modern Methods Engineering and Material Handling. He

(Turn to page 37)

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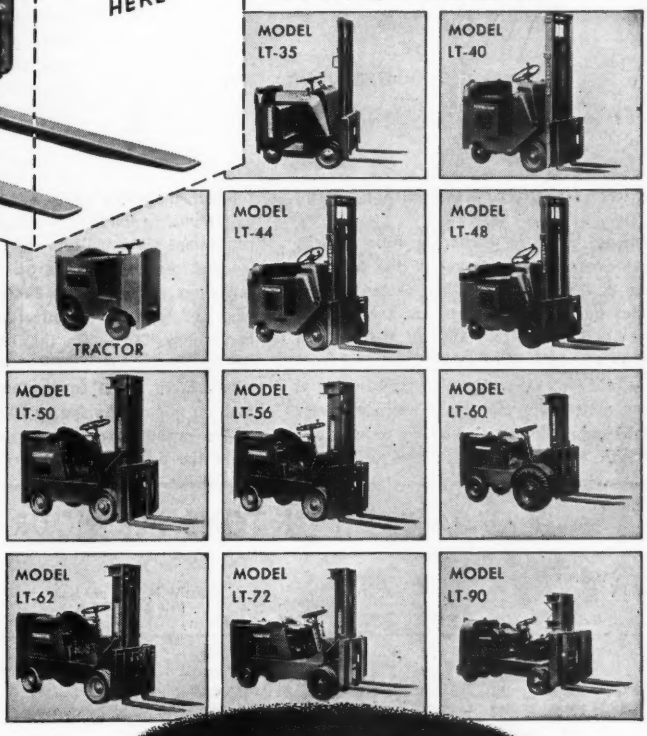

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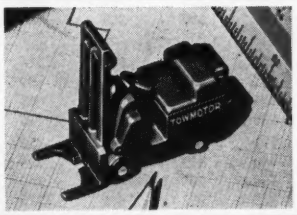

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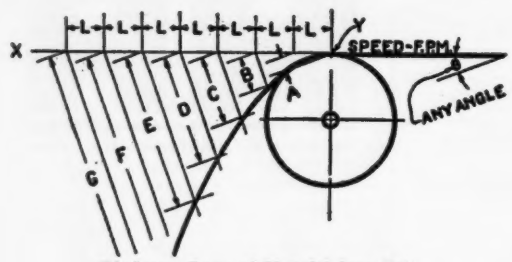
FLOW ENGINEERING DATA PAGE

A new, regular feature designed to help the engineer and others responsible for material handling. The FLOW Engineering Data Page will cover a different category of equipment each month.

HOW TO DETERMINE DISCHARGE CURVE OF A BELT CONVEYOR



Discharge Curve of Material from Belt

The accompanying diagram shows a method for plotting the true discharge curve of a belt conveyor. Complete instructions for plotting this curve will be found on this page. It is often desirable to know the exact discharge curve, especially in slow speed conveyors, to aid in placing the discharge chute in the correct position.

	Decimal	Fraction Ins.		Decimal	Fraction Ins.
A	.43	7/16	I	39.07	39 1/16
B	1.93	1 15/16	J	48.24	48 1/4
C	4.34	4 11/32	K	58.37	58 3/8
D	7.72	7 23/32	L	69.47	69 15/32
E	12.06	12 1/16	M	81.53	81 17/32
F	17.37	17 3/8	N	94.55	94 9/16
G	23.64	23 5/8	O	108.54	108 17/32
H	30.87	30 7/8			

HOW TO DETERMINE DISCHARGE CURVE

Material as it is discharged from a belt, would continue to travel in the direction and at the speed of the belt except as it is acted upon by two forces, i.e., the force of gravity and the resistance of the air, the latter of which being small is omitted from the following calculations. In the handling of any materials except those which are very light and easily deflected by the resistance of the air or materials which tend to stick to the belt, the discharge from the belt may be determined as follows: In a drawing, to any convenient scale, indicate the discharge pulley and the angle of the belt to the horizontal as shown in the sketch upon this page and continue the direction of the belt in the line "XY." On this line from "Y" lay out the equal dimensions L.L.L., etc., where L. in inches equals speed of belt in feet per minute, divided by 100. At the end of the various spaces L.L. drop down vertically the dimensions A. B. C. D., etc, in inches, taken from the table above.. Then to find the trajectory or path of the material as it leaves the belt, draw a continuous curve from the point Y thru the bottom of the successive dimensions A. B. C. D., etc.

At the maximum speed of belts, there is seldom an occasion to obtain the true path of the delivery of material. However, for slow speeds it is often necessary to find the highest point in the face of the pulley at which a discharge chute may be placed where breakage is a consideration.

CAPACITIES IN TONS PER HOUR FOR BELT CONVEYORS

Width of Belt	Weight per Cu. Ft. of Material	Capacity in Tons per Hour Belt Speed—F.P.M. 100	150	200	250	300	350	400	450	500	550	600	Cross Section of Load Square Feet	Cu. Ft. per Hr. at 100 F.P.M.	Cu. Yds. per Hr. at 100 F.P.M.
	50	16	24	32	41	49	...	...	...	...	...	...	....	...	...
	75	24	37	49	61	73	...	...	...	...	...	...	....	...	...
14"	100	32	49	65	81	97	...	...	...	...	...	...	.108	648	24
	125	40	61	81	102	122	...	...	...	...	...	...	....	...	...
	50	21	32	42	53	63	...	...	...	...	...	...	....	...	...
	75	31	47	63	79	94	...	...	...	...	...	...	....	...	...
16"	100	42	63	84	105	126	...	...	...	...	...	...	.140	840	31
	125	52	79	105	131	157	...	...	...	...	...	...	....	...	...
	50	27	41	54	68	81	95	108	...	...	...	...	....	...	...
	75	40	61	81	101	121	142	162	...	...	...	...	....	...	....
18"	100	54	81	108	135	162	189	216	...	...	...	...	.180	1080	40
	125	67	101	135	169	202	236	270	...	...	...	...	....	....	...
	50	34	51	67	84	101	118	135	...	...	...	...	....	....	...
	75	51	76	101	127	152	177	202	...	...	...	...	....	....	...
20"	100	67	101	135	169	202	236	270	...	...	...	...	.225	1350	50
	125	84	127	169	211	253	295	337	...	...	...	...	....	....	...
	50	50	75	100	125	150	175	200	225	250	...	...	....	....	...
	75	75	112	150	187	225	162	300	337	375	...	...	....	....	...
24"	100	100	150	200	250	300	350	400	450	500	...	...	.333	2000	74
	125	125	187	250	312	375	437	500	562	625	...	...	....	....	...
	50	81	121	162	202	243	284	324	364	405	...	...	....	....	...
	75	121	182	243	304	365	425	486	546	608	...	...	....	....	...
30"	100	162	243	324	405	486	567	648	729	810	...	...	.540	3240	120
	125	202	304	405	506	608	708	810	911	1013	...	...	....	....	...
	50	117	177	235	293	352	413	470	528	587	646	705	....	....	...
	75	176	264	352	440	529	616	705	792	881	968	1057	....	....	...
36"	100	235	351	470	586	705	822	940	1055	1175	1292	1410	.783	4700	174
	125	294	441	587	735	881	1029	1175	1313	1469	1616	1762	....	....	...

*Based on 60% Cross-Sectional Load.

Turner Die Racks lined up for storage and prompt movement to desired locations. Dies always visible, accessible and fully protected.

Unlimited stock of materials is always accessible on Shop Box Racks.

Pallet separates Wooden-side and All-steel Bin Sections.

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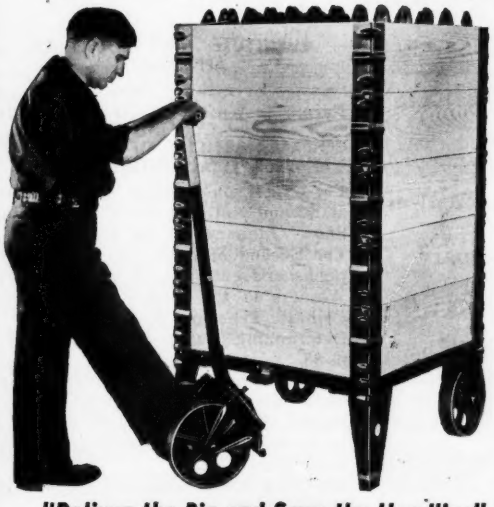
THE TURNER SYSTEM OF MATERIALS HANDLING



"Deliver the Bin and Save the Handling"

On short hauls, waiting for lift trucks WASTES plenty of TIME, BOOSTS COSTS, CUTS PROFIT. Check that in your own plant! With the Turner System you DON'T HAVE TO WAIT. Everything is on semi-live trucks — quickly moved to desired locations with the Jimmy.

That's just one of MANY advantages of this completely integrated system which leading firms have used increasingly for 30 years to cut SPACE, LABOR and EQUIPMENT costs UP TO 50%.

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Die Rack shelves may be inverted to form trays as shown in this unit.

Turner 8-way Pallets are built to last for years, insure sturdy stacking. Made with three types of decks: Floor Plate, steel and wooden (illustrated).

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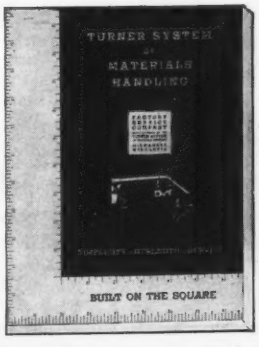

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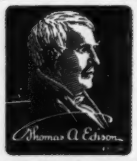
If you do not already use EDISON, get a current price quotation —you will probably find initial cost *much lower* than you think. Couple this factor with well-known EDISON long life and you will have the key to year-after-year economy.

ADVANTAGES OF EDISON NICKEL-IRON-ALKALINE BATTERIES: They're mechanically durable; electrically foolproof; quickly and easily charged; simple to maintain; not injured by standing idle.



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Nickel • Iron • Alkaline
STORAGE BATTERIES

EDISON STORAGE BATTERY DIVISION
of Thomas A. Edison, Incorporated, West Orange, N. J.
In Canada: International Equipment Co., Ltd., Montreal and Toronto

November, p. 62.
•Packaging Aids the Ice Industry. November, p. 66.
Packaging Efficiency for Cartons (rice). December, p. 50.
Spicy Story (pepper). December, p. 53.

PAPER PRODUCTS (GREETING CARDS)
$711 Investment Saves $2749. March, p. 22.

PAINT PLANT OPERATIONS
(See also listing under Packaging Mechanics Section.)
Portability Eliminates Two Floors. April, p. 36.
Good Layout and Mobility (in paint filling). April, p. 25.
Saved 30 Percent of Investment in Only One Year, Parts I and II. May, p. 20 and June, p. 26.

PHARMACEUTICALS
(See also listing under Packaging Mechanics Section.)
Flexible Packaging Line for Pharmaceuticals. March, p. 42.
Powered Hand Pallet Trucks Solve a Problem. May, p. 70.
Upping Packaging Production (of baby powder). May, p. 54.
Complex Package—Efficient Production (Milk of Magnesia). August, p. 50.

PIPE HANDLING
Mobile Handling for Pipe (with a yard crane). May, p. 34.

RUBBER INDUSTRY
We Cut Our Costs by $80,000. December, p. 24.

REPLACEMENT PARTS
Many Automotive Parts—One Line. January, p. 91.
A Manufacturer Solves His Spare Parts Problem. August, p. 19.

STEEL HANDLING
Modern Steel Warehouse. August, p. 9.
Straddle Trucks in a Steel Mill, Part I. August, p. 32.
Straddle Trucks in a Steel Mill, Part II. September, p. 50.

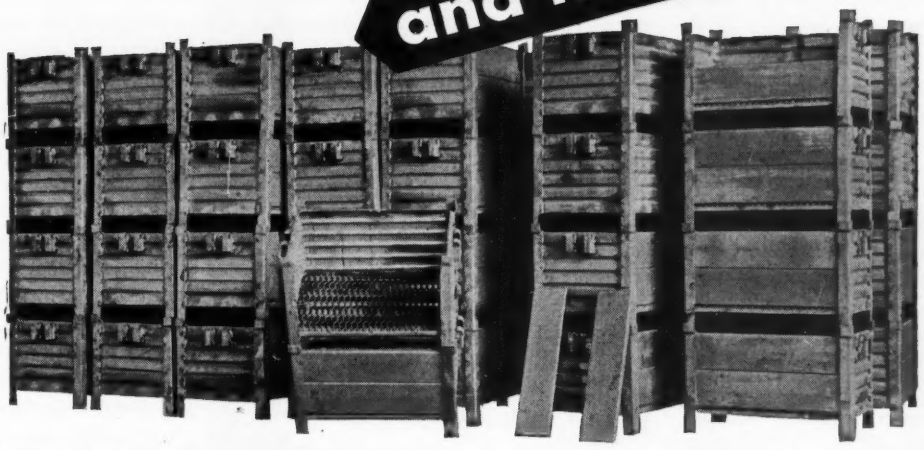
TOBACCO PRODUCTS
One Million Cigars a Day. July, p. 64.

WAREHOUSE OPERATIONS
(See also listing under Steel Handling.)
Circular Warehouse, Material Handling Machine. January, p. 56.
Now 9 Equals 45 (manufacturer's warehouse). September, p. 38.
One-Man Warehouse—for Veneer. October, p. 19.
"Keep Everything Movable" — in a Furniture Warehouse. October, p. 24.
Modernizing a Multi-Story Warehouse. November, p. 28.

WAX PRODUCTS
(See also listing under Packaging Mechanics Section.)
Wax Cools on Way to Packing. June, p. 54.
Planning a Pallet Program. August, p. 12.

WIRE COILS
Coils Ride the Monorails. June, p. 26.

TRUSCON OPEN SIDE STEEL BOXES *speed efficiency* through side-loading and tiering



● Look at the advantages of Truscon Open Side Steel Boxes: *They save space!* Tiered boxes use only the floor space required for the bottom box. • *They save time!* No stacking and unstacking to get at stock; open sides make contents of boxes available at all times. They save labor! Because they save time. • *They aid inventory!* Always open, or easily opened for counting and inspecting stored stocks. • *They aid production!* Workers can select materials quickly and easily. Materials can be grouped by size, type and thickness. • *They aid shop maintenance!* By occupying small floor space and by being transportable while tiered, Truscon Steel Boxes make it easy to keep shop floors clean and repaired.

Truscon Open Side Steel Boxes are made in various sizes to fit individual requirements. They are fabricated from heavy gauge steel sheets of uniform thickness, into which deep reinforcing ribs are pressed to produce maximum strength and rigidity. Despite their rugged construction, they are comparatively light in weight, and can be used for any type of commodity, with hand or power lift trucks or cranes.

Investigate the possibilities of using Truscon Open Side Steel Boxes in *your* plant . . . and enjoy the advantages these efficient material handlers can give you.

Write for Truscon Materials Handling Equipment Catalog, which shows entire line of Steel Boxes and Skids, complete with illustrations and specifications.

TRUSCON STEEL COMPANY

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SUBSIDIARY OF REPUBLIC STEEL CORPORATION

ON THE PALLET

NEWS • VIEWS • TRENDS

A BASICALLY new, primary standard of frequency and time, invariant with age, has been developed by the National Bureau of Standards. It is an atomic clock based on a constant natural frequency associated with the vibration of the atoms in the ammonia molecule. Based on a principle developed by Dr. Harold Lyons of the Bureau's microwave research laboratory, the new clock promises to surpass by one or two orders of magnitude the accuracy of the present primary standard, the rotating earth. This is the first such clock ever built and is controlled by a constant frequency derived from a microwave absorption line of ammonia gas, providing a time constancy of one part in ten million. Theoretical considerations indicate a potential accuracy of one part in a billion or even ten billion.

OFFICIALS of The Thew Shovel Co. recently gathered to witness the departure of the 4000th Lorain Moto-Crane to be built in the last nine years. The crane was developed in 1939. Carriers are built in Bucyrus, Ohio, and are driven 80 miles under their own power to Thew's plants in Lorain where the revolving superstructures, which are built there, are mounted on the carriers. The Moto-Crane is a rubber-tired crane and is in addition to the crawler shovels and cranes built in Lorain. In contrast to the company's original 3½ ton truck crane which appeared in 1919, today's Moto-Cranes are rated as 20 tons lifting capacity, and may be used with booms up to 115 feet in length.

TO HELP the business community keep a practical eye on the flood of new products now rolling off production lines, more than 1000 new products and services now ready for marketing, have been compiled into a compact 80-page 1949 New Products booklet by The N. Y. Journal of Commerce. Data were gathered from more than 750 manufacturers and are classified by industry and indexed by name and address of each producer. Copies of the booklet may be had at 50 cents each from the N. Y. Journal of Commerce, 63 Park Row, New York.

"THE plant that was built around a material handling system." That is the way in which company officials describe the new plant of The Yale & Towne Mfg. Co., in northeast Philadelphia. The plant was seen by the public and the press for the first time during the recent National Material Handling Exposition. First plans for the factory were released in June, 1946, and the final approval to build was issued in November of the same year. The present building is located on a 93-acre site. Most of the structure has a clearance of 18 feet below the girders. The roof over many departments has a 24-foot clearance. Certain areas are enclosed to confine dust, noise and heat and to exclude dust. The remainder of the building is open except for wire mesh partitions. Three years went into the layout and design of the plant, the development of revised manufacturing methods, and the designation of new equipment. The basic layout was designed to provide an eventual increase of 35 per cent in productive activity. The general arrangement of departments was designed to improve the flow of work, it is said. One typical part in the old plant had 22 operations and was moved 45 times a total distance of over 10,000 feet. In the new plant, the same part travels only 3,380 feet, a saving of 67 percent. Savings of 30 to 50 per cent in distance traveled are very common.

A NEW building to house the Los Angeles area retail sales and service organization for Hyster industrial trucks has been opened recently at 5301 Pacific Blvd., Huntington Park, Cal. This announcement was made by Ray Ronald, western division sales manager of the Hyster Company. Operations, with a staff of 15 people, are under the management of L. W. Barclay.

ACME STEEL CO. of Canada, Ltd. has moved its general offices and Montreal branch to new and larger quarters. The new address is 660 St. Catherine St., West, Montreal, Quebec.

ONE of the many benefits Australians gained from the sojourn of the United States armed forces in Australia during the recent war was an insight into the value of modern material handling methods and equipment. The interest this subject now holds for that country's businessmen has been evidenced by the large attendances of top-line industrial executives at a series of demonstrations of material handling methods and equipment held in Australia's leading cities during 1948. These demonstrations have been organized by the Institutes of Industrial Management in Melbourne, Sydney and Adelaide, in co-operation with the Department of the Army and the Division of Industrial Development.

THE GREATEST SO FAR . . .

(Continued from page 28)

was followed by Allan H. Mogensen, who discussed Work-Simplification in Material Handling. Next was a panel discussion on Opportunities for Distribution Economies. Included in the panel were Neil Loney, Fred Carpi, W. F. White, and J. W. Milliken, representing industry, the railroads and the highway carriers.

Another session was devoted to case studies, and was presided over by J. B. McGinn, American Viscose Corp., and president of Material Handling Society of Philadelphia. Papers covered such subjects as: Efficient Co-ordination of Material Handling Equipment in a Manufacturing Plant, by C. M. Harris; Applications of Methods Engineering and Equipment Design by Donald E. Farr; Ups and Downs of Handling in Multi-Story Warehouses, by D. O. Haynes.

A second panel discussion was entitled Co-ordinating Material Handling with Related Engineering and Management Functions. The topics covered were Industrial Relations, Cost Control, Lighting, Building Construction, and Safety. A session devoted to Advances in Technique was presided over by Jervis B. Webb, president of Jervis B. Webb Co. It discussed automatic pallet loading; layout, operation processing; and developments in bulk handling. An equipment symposium depicted advances in design and applications of conveyors, cranes, hoists, elevators, industrial trucks, and marking and stenciling equipment.

The final meeting was devoted to "Material Handling of Tomorrow" and included the following talks: The Biggest Handling Job in the World; Tomorrow in Air Handling; Lessons from the Berlin Airlift.

Plans for next year's show are not as yet complete. It is reported that it may be held in Chicago, bringing the exposition to the central part of the country for the first time. The National Material Handling Exposition has already become one of the major U. S. shows.

9 out of 10 companies can save on shipping with ACME STEELSTRAP

ACME STEEL CO. CHICAGO

HERE'S HOW EBCO DID IT. Ebco Manufacturing Company, Columbus, Ohio, package their water coolers using Acme Steelstrap and Acme Equipment. They report a saving of 33% in materials and time over previous packaging method.

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Find out how an Acme Shipping Specialist can help you. Call him (no obligation, of course) — or mail the coupon today for free booklet of case studies, "Savings in Shipping."

Close-up of the Acme No. 3 Steelstrapper *showing application of Acme Steelstrap which saved 33% in packaging cost.*

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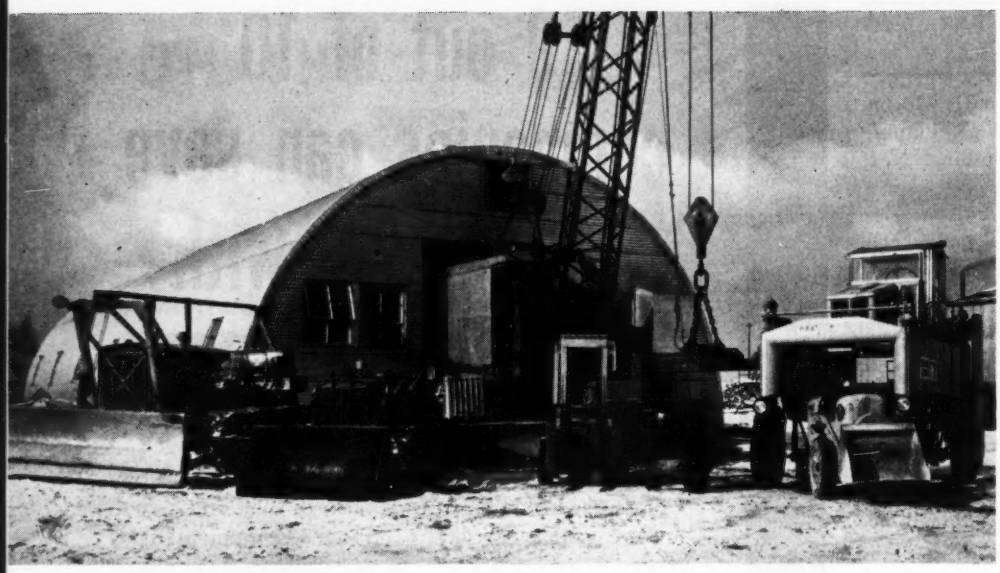


The varied equipment in this operation ranges from a powered wheelbarrow through tractor-mounted scoops, bulldozers, fork and straddle trucks to locomotive cranes. Some of these machines operate 24 hours a day, 5 days a week.

MAINTENANCE— *Whose job?*

By FRANK C. WIER

Supervisor, Material Handling,
Steel and Tube Division

The Timken Roller Bearing Co.
Canton, Ohio

"The old idea of plant maintenance needs to be related to material flow and brought up to date with the present-day concept of material handling."

WHAT plant department should be charged with the maintenance of material handling equipment? The subject has long been a controversial one. Should maintenance be the responsibility of the millwright or garage or electrical department? In some companies maintenance is still being done "outside," while others are just getting around to setting up maintenance departments of their own.

Instead of attempting to argue the question "who should do it?" I will discuss the organizational set-up and provisions in our own plant. Such a factual statement is likely to help shed some light on the controversy.

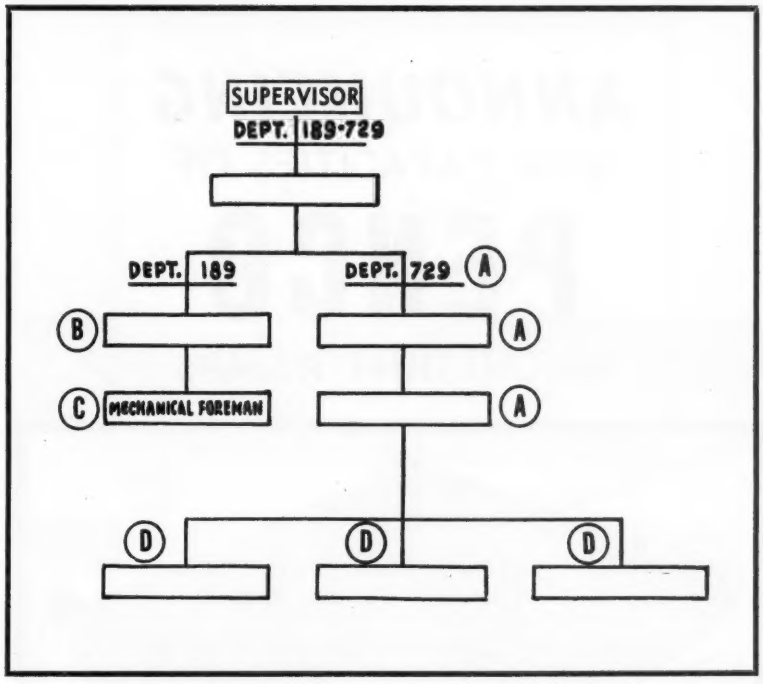
One Person Has Full Authority

We in the Timken organization have long felt that the principle or theory governing the *operation* of the material handling equipment should also determine the maintenance set-up. In the Timken Steel and Tube Division, the material handling function and maintenance of material handling equipment is under centralized supervision.

The accompanying supervisory chart shows how the various functions of the material handling department, including maintenance, are organized in our company. No. 189 indicates the material handling department, while No. 729 is the

control function. The personnel indicated by (A) is responsible for the routing, scheduling and inventory of materials, while the individual at (B) is in charge of both the equipment operators and the mechanics. (C) designates the mechanical foreman, who is responsible for mechanical repairs and the spare parts inventory. The maintenance crew is under his personal direction. The personnel appearing under (D) controls certain material control functions as they relate to handling operations. Thus, maintenance and handling are knit together under one head in a closely coordinated organization.

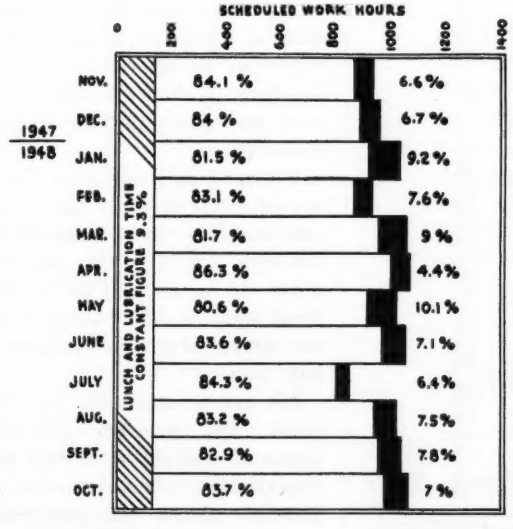
This arrangement helps keep the flow lines moving in a number of ways, which, after all, is the ultimate and real purpose of any maintenance set-up. To cite but one example. Let us say there is a piece of equipment operating that appears to need some work done on it. The mechanic is of the opinion that it should be taken out and overhauled. But the operating personnel wants to keep the machine running until the load has been reduced.

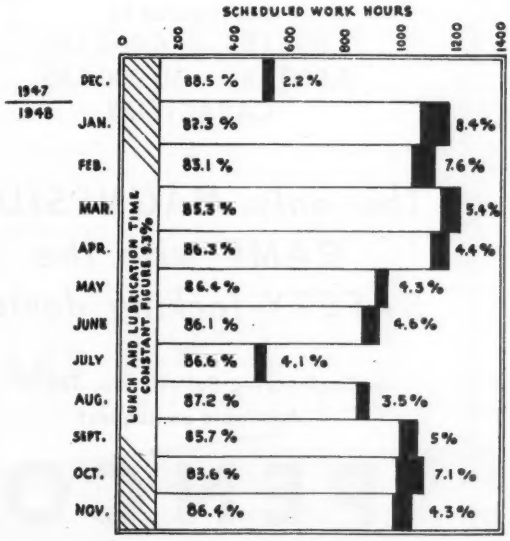


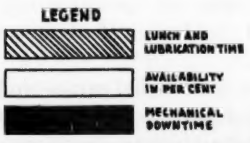
Organization combines handling and maintenance functions under one supervisor.

With undivided responsibility, there is in such cases no chance for time-consuming delays that would be occasioned by differences of opinion. In the independent material handling department,

(Left) Mechanical downtime and availability of locomotive cranes as related to scheduled hours. Cranes normally operate on a 24 hours per day, five days per week schedule. Average mechanical downtime per month is 8.9% of hours scheduled for work. (Right) Mechanical downtime and availability of straddle trucks as related to scheduled hours. Trucks normally operate on a 24 hours per day, five day per week schedule. Average mechanical downtime per month is 5% of the hours scheduled for work.







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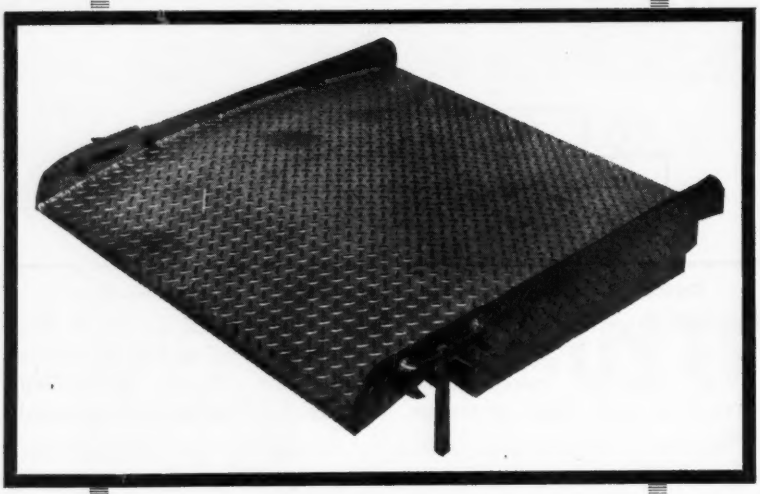

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FORMERLY PALLET ENGINEERING CO.

maintenance is under one head. Decisions are made by him immediately—for the benefit of the flow of material. The plant is not pitted against the material handling department; maintenance is important of itself because of its relationship to other prime factors. Prompt decisions keep the vehicles rolling and the lines flowing.

The Large Plant—the Small Plant

Where to draw the line between the large and the small plant in relation to an independent material handling maintenance department? This question is frequently asked wherever material handling men consider the subject. Up to this point, the discussion was developed with the larger plant in mind. By "larger plant" I mean one where there are more than 20 maintenance men, or where the top supervisors don't know the special abilities of the individual men, or where the maintenance force is large enough so that it has to be departmentalized.

From observations made in smaller plants it appears that these likewise stand to benefit from the specialization described in the foregoing section. In a small plant this may require special training of one maintenance man who will devote most of his time (though not exclusively) to the care of material handling equipment, while other men would be full-time on plant maintenance.

No hard and fast lines can be drawn in all cases, though a general principle can be followed as a criterion, namely: The flow lines must not be allowed to be interfered with by plant maintenance; the stream of production must be kept moving.

No matter what the size of a plant, the problem invariably seems to boil down to this same consideration. Observance of the principle stated will help obtain the value of specialization, and avoid the danger of overspecialization.

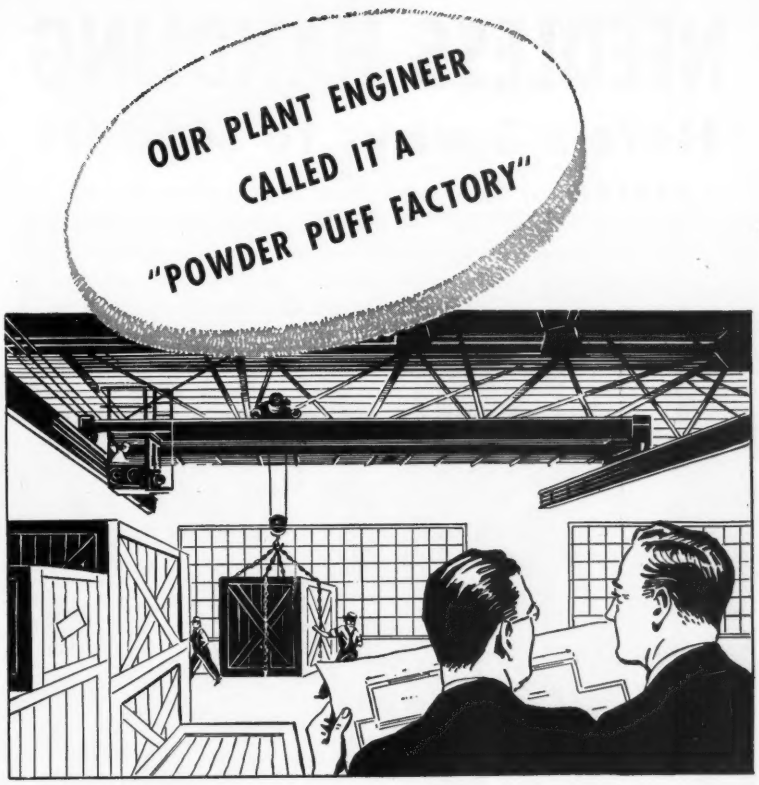
The millwright, garage and electrical departments perform general plant maintenance functions. They

are normally so occupied with the problems of major plant machinery that it is impossible to expect them to give spot service to the material handling tools. Moreover, dependence on the main plant maintenance department would entail keeping on hand enough spare or stand-by equipment to allow plant maintenance to make the repairs in its own good time. Suppose a mill breaks down when a yard crane, straddle truck or fork lift truck needs immediate repairs. It's easy to visualize the complications that are bound to result. Unfortunately they are complications with which too many material handling executives and engineers are familiar. The subject of spare equipment is considered in detail in later paragraphs.

Timing the Maintenance Job

The organization of the maintenance crew has an important bearing on the efficiency of the department. Here is how we have worked out this phase. The mechanical foreman does not work on Monday so that he is available on Saturday —the day on which the equipment is not being used. In order to have this foreman and the three regular maintenance men available on Saturday, our manpower coverage has been arranged as follows. On the Monday "day turn" we have only one maintenance man, which is also the case during the night turns throughout the week. This is enough manpower to take care of any routine and emergency repairs that may occur during those shifts. Beginning with the Tuesday day turn through Saturday, our maintenance department is in full operation—the foreman and the three regular maintenance men.

Thus we have turn men and day men. This gives us eight hours each week (for the full crew) to take care of major replacement jobs, check-ups and preventative maintenance at a time when the equipment is not working. You can't maintain equipment when it is supposed to be running. The well-known baling wire kind of repairs prove to be costly in the end.



"We liked the location and the size, but when we figured on increasing crane capacity, the structure just wouldn't take it. Our plant man finally gave up in disgust saying, 'They must have built this shop for a powder puff factory.' "

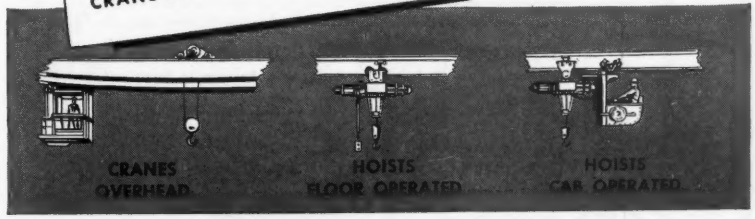
"When we decided to build, you can bet we planned *in advance* against the possibility of a future need for greater crane capacity."

"The Shepard Niles specialist was a great help in this planning. He seemed to know just about what loads were maximum in different types of industry. We were guided, to a great extent, by his suggestions."

The time to plan for most economical materials handling is before the building is built or the remodeling completed. Ask the Shepard Niles specialist to sit in—he has lots of experience behind him—and his sales interest is not concentrated on any one type of lifting tool.

SHEPARD NILES
CRANE AND HOIST CORPORATION

Makes and sells all three lifting tools for airborne shop loads.



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SYSTEM For volume movements of manufactured parts, packaged items, tote pans, etc., use a complete conveyor system. Standard Conveyor Systems can be designed to meet your individual needs . . . with belts, wheels, rollers or chutes complete or in combinations as needed. You can conveyorize a department or a complete plant from raw stock receiving to final shipping.

SECTION If your problem is handling parts or packages within a department, you can buy small sections of roller or wheel conveyors that are easily transported and set up where needed. This is ideal for loading docks, warehouses, shipping platforms and stock rooms. Saves time and labor, minimizes damage from excess and rough handling. Use gravity for power.

UNIT Portable powered units, like the Standard Handi-Belt shown here are a real time and labor saver. They handle boxes, bags, cases and small bales with equal facility. Reversible power drive permits higher stacking and handling in warehouses. Makes for faster unloading and loading in trucks or cars. Can be used in confined space. Plug-in any local outlet.

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Standard

GRAVITY & POWER CONVEYORS

The Problem of Spare Equipment

This brings us to the important subject of spare or stand-by equipment. What percentage of the scheduled operating equipment should be spares for maintenance and emergency purposes? Such a percentage is easy to determine in a plant where a fleet of uniform vehicles performs the same type of function (as car loading) every day. Our equipment, on the other hand, ranges all the way from a powered wheelbarrow to earth-moving machines and locomotive cranes. In between are straddle trucks, fork lift trucks, wheel and crawler mounted cranes, tractors, scoop trucks, and a variety of special-purpose machines. This diversity of equipment (with one or a few pieces in each category) sharply emphasizes the need for both an independent maintenance department and preventative maintenance care.

It is well known that excess spare equipment means (1) excess investment, (2) idle equipment and (3) idle operators, a situation which results in laxity. How to meet this problem? Again, I will confine my remarks to the operating principles and theories as they have been developed by the Timken organization.

Replacements by "Units"

We have found the following two-phase practice satisfactory. 1. A strictly observed maintenance schedule. 2. While we do not have extra spare equipment, we do have an adequate supply of spare parts.

As indicated before, the maintenance program stresses prevention, or replacement of parts preceding failure. The general check-up and inspection on Saturday is designed to catch any weaknesses. We maintain a stock of about 5000 spare parts items. One half-time operator is responsible for receiving, cataloging and stocking this material. Our records give us perpetual inventory control. The details will be given in a later article in this series.

Replacements of parts are usually on a "unit" basis—that is, we try to avoid tinkering with minor

parts. If, for example, rings in an engine need to be replaced, the whole engine will usually be replaced.

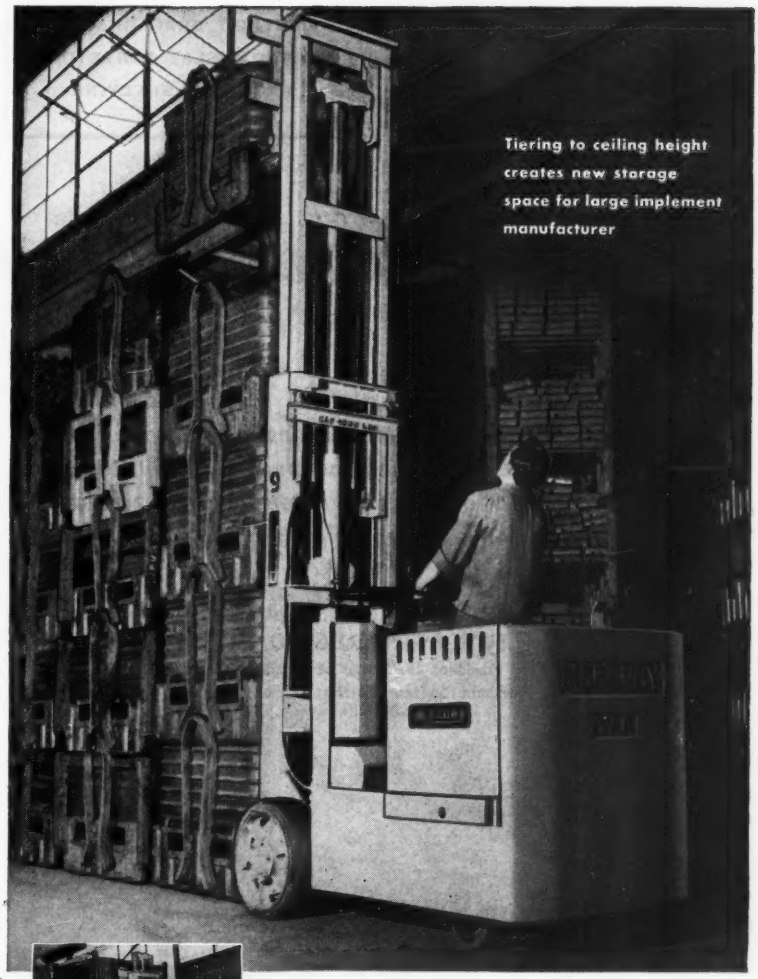
The Question of Down Time

We aim for a down time (due to mechanical failure) not to exceed six per cent on straddle trucks and 10 per cent on locomotive cranes. (A higher percentage is allowed for locomotive cranes because of their greater complexity resulting from the three internal combustion engines per unit). A study was started some time ago to give us the down time for all operating units and the specific reasons for their failures.

The findings in the continuing study are entered on a master record, from which the graphs were developed that are reproduced on these pages. In both cases, the down time is well within the permissible limit. Note that the straddle trucks and the locomotive cranes operate 24 hours per day, five days per week. While in a given month the goal might be exceeded slightly, the average down time per month is below the set limit for the year that begins December 1, 1947.

From the principles set forth in this discussion, the following conclusions seem warranted. 1. Maintenance under one departmental head is an effective means of coordinating and facilitating the operation of the equipment. 2. An adequately organized and independent maintenance department assures that repair jobs will be done promptly. 3. Regardless of how efficient plant maintenance may be, it is still felt that the intimate connection between material handling, operating and maintenance people produces the desired result with the least friction and delays. 4. Our set-up gives us efficient manhour maintenance production; there is always a "unit" to be repaired, regardless of the shift. 5. Lastly, minimum down time means maximum machine hour production. This is another way of saying that the stream of production is kept moving.

5 Times Greater Inventory handled with MERCURY fork trucks



Mercury "Yak" Fork Truck quickly stacks 4000 lb. load

FIVE times greater inventory handled with no appreciable increase in plant facilities—that's the record established when a fleet of Mercury Fork Trucks replaced former handling methods for this large implement manufacturer.

Tiering to ceiling height created new storage space . . . unit handling of 2500-4000 lb. loads expedited materials from receiving, through processing to shipping. It'll pay you to consult Mercury's 38 years' handling experience. Ask a Mercury Sales Engineer to call.

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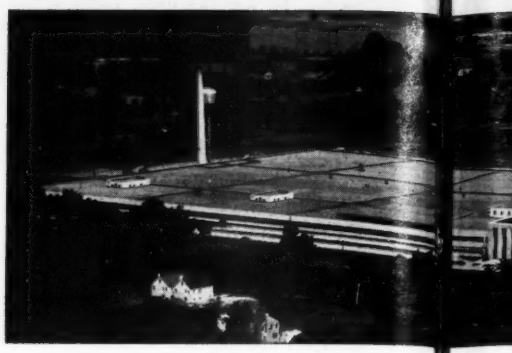


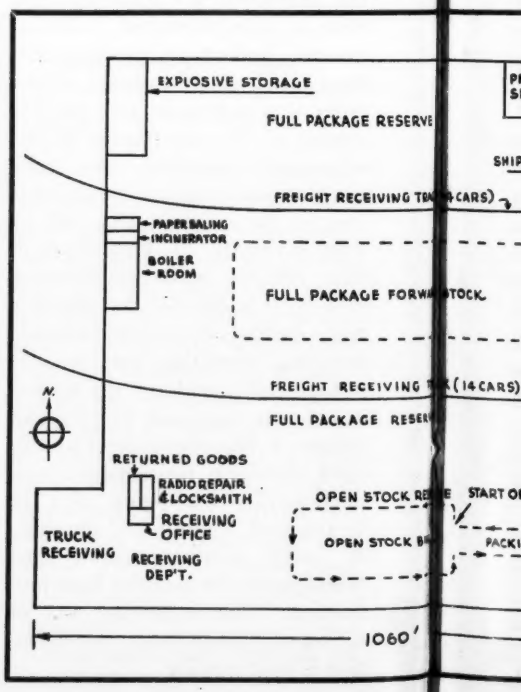
How Hibbard ships 15,000,00

The new Hibbard, Spencer, Bartlett & Company's warehouse represents the latest handling innovations in hardware distribution. Storage, order assembly and shipping of 35,000 items and sizes of hardware are reduced to an astonishingly simple operation. An excellent planning job.

By F. F. THREADGOLD,
Vice President In Charge of Operations
Hibbard, Spencer, Bartlett & Co.,
Evanston, Ill.

HIBBARD, Spencer, Bartlett & Co. has been known for almost 100 years as a hardware jobber, and in June of this year our company started operations in its new 800,000 sq. ft., one-story building, which was recently completed in Evanston, Ill. (An additional 70,000 sq. ft. of air-conditioned office space is located on the second floor.) This vast building, 800′ x 1060′, may be said to have come

FLOW SHEET shows all major operat reas and f



DRAG CHAIN propels stock trucks past bins.

VIEW OF LARGE H. S. B. & Co. plant in Evanston.

SLAT CONVEYOR delivers bin items to scale.

...00 pounds of hardware a month

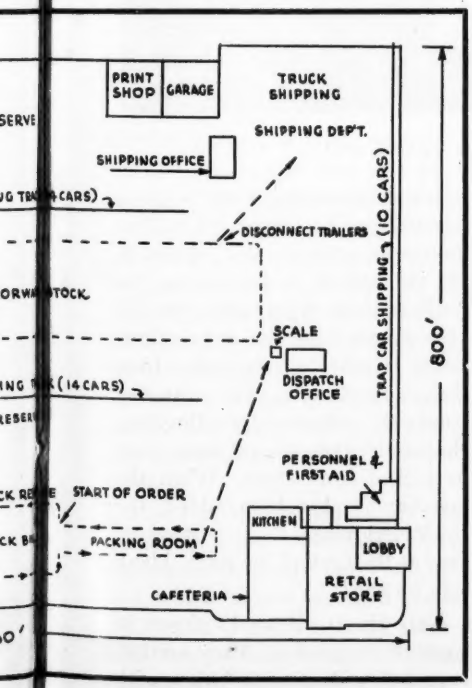
about as a result of the present trend toward efficient material handling. The old H. S. B. & Co. building, a massive 14-story structure near Chicago's downtown section, is still considered an excellent building of its kind structurally. But the operating advantages in a one-story building, revealed in preliminary calculations, proved of too far-reaching importance to justify continuing operations in the older building. Mass handling meant lower unit cost production and better service to the thousands of hardware dealers served by our company, lower overhead expenses, better working conditions, and various distribution economies.

Simplicity Is Noteworthy

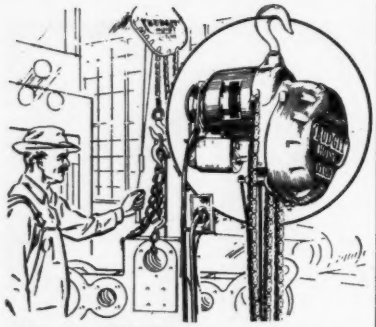
Visitors are uniformly impressed by the essential simplicity of the large-scale operation, which involves the receiving, storing, order assembly and shipping of 35,000 items (and sizes) of hardware. The explanation is careful planning of every detail of the layout, material flow, and handling methods.

A glance at the accompanying flow sheet shows the arrangement of stock areas, and transportation and fixed handling facilities. Two railroad tracks for in-shipments en-

...operating areas and fixed conveyor installations.



PACKING CONVEYOR. Note racks for empties.



How MUCH you save

You'll never know how much time and money you can save in operating costs on production, assembly, and inspection lines until you install a portable 'Budgit' Electric Hoist to do your lifting of heavy machine parts or the machines themselves.

These small, portable hoists lift up to 4000 lbs. with incredible ease and speed and free your men from the burden of lifting parts to the machines on which they work.

'Budgit' Hoists give you more production at less cost for they permit workers to expend all their energy on profitable work instead of costly lifting. There is more to 'Budgit' lifting than this. Your workers are free from rupture, sprained backs, torn ligaments and you are free from costly compensation to injured men.

Nothing could be simpler, less costly than the installation of a 'Budgit' Hoist. Just hang it up, plug into the nearest electric socket, and use! That's all! The cost of current is small, and maintenance costs negligible due to a 'Budgit' Hoist's efficient design and simple construction.

Test these savings by installing a 'Budgit' Electric Hoist in some spot in your plant where lifting slows up production.

Made in sizes to lift 250, 500, 1,000, 2,000 and 4,000 lbs. Prices start at $119.00. Write for Bulletin No. 371.

MAXWELL MANNING MOORE

'BUDGIT' *Hoists*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.

ter the building from the west and extend for about three-fourths of its length. The full package reserve stock is located strategically parallel to each track, as indicated, with the forward (or current) full package stock areas between both. Thus hauls from the incoming cars to storage, and from the latter to current stock locations are held to the shortest possible distance. The stock placement for bin merchandise (less than case lots) is similarly arranged. A third track enters the building at the east (for outshipments), and a truck dock is also continuous with this freight car platform.

Thus the over-all flow stands out clearly. The entire stock is divided into two categories—original package and open stock bin merchandise. During replenishing, the material flows in a north-south direction (laterally across the building), and during order assembly the movement is generally from west to east. This condensed outline of the flow will be amplified with details of the equipment and procedures used.

RACKS for pallet loads of "package" stock.

Simple Job Requirements

Let us follow through an order assembly, which starts with open stock bin merchandise. The drag-chain method of assembly is integrated with pallet-fork-truck handling.

The customer's order first comes to the bin order department, where the order is scheduled and placed on a stock selection truck. Order reading and selection are facilitated by two methods: 1. The catalog numbers show whether an item is bin or original package merchandise. The absence of a prefix indicates bin items, which must be packed. 2. Stock is not laid out by lines, but numerically by departments. For example, if a half dozen lines of toys are carried, the stock clerk need merely be able to read figures. This both speeds order selection and shortens the training period for new personnel.

The stock truck with the order is hooked to the overhead drag chain which circles the open stock bins and the packing conveyor to the east of it. On its front end the truck has a card rack, into which the dispatcher inserts cards (each bearing one letter) to show from which departments stock is to be selected for a particular order. Thus if only departments B, F, Q and W are involved in a given case, the clerks in those departments can tell at a glance that the approaching truck requires merchandise from their departments. The traveling trucks are unhooked from the drag-chain only when several items must be picked from stock. When the merchandise has been added, the stock clerk places the departmental card at the back of the stack, blank side forward.

Note the stock trucks shown in some of the photos. They are 60" long, 36" wide, and 50" high, with

two swivel and two rigid casters. The triple deck shelving is divided longitudinally in the center by an expanded metal partition into two sets of three shelves each. The carrier also has expanded metal ends. The "open" partitions in the center and at the ends make the contents visible from any direction. This is an aid in checking and assures that no small packages will be overlooked by the packers.

A word about the metal bin shelving, of which we have more than a mile in use. It is 7'3" high, 30" deep and 36" wide. The shelves are adjustable vertically so that each bin opening can be readjusted for different items when necessary. The individual bin openings vary from 8" to 36", with an average of 12" for most items. Bin openings that are not planned can mean both loss of shelf capacity and waste of square footage.

Steel Slat Conveyor For Packing

The loaded trucks arriving from the open stock bins are unhooked from the drag chain and the items are checked. The units are then spotted for the convenience of the packers stationed along the length of a 36" wide steel slat conveyor, which has a 30" wide packing table on each side. (The methods and equipment provided for the handling of empty shipping containers are detailed in a separate section.)

The packers sort out the merchandise from the stock trucks according to the different freight classifications indicated, and show on the packing ticket the number of boxes of each type of merchandise. All necessary packing materials are close at each packer's hands. Incidentally, a second packing line is set up for the smaller packages sent by parcel post and railway express.

The full and sealed boxes are pushed onto the slow-paced steel slat conveyor, a solid carrying surface, which travels overhead about 300 feet in a north-easterly direction from packing to the weighing station. This adjoins the full pack-

Berger Wedge-Lock Shelving

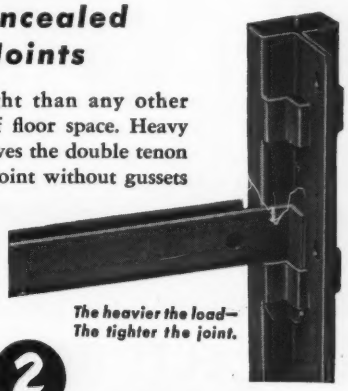
gives you these

2 big advantages

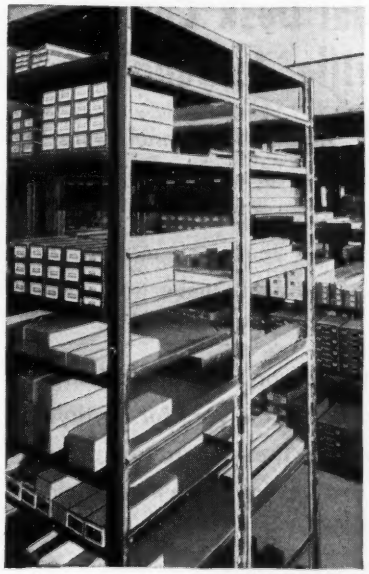
in materials handling

1 ***Wedge-Lock Concealed Sway-Proof Joints***

Wedge-Lock bears far greater weight than any other shelving, yet requires a minimum of floor space. Heavy loading increases overall rigidity—drives the double tenon deeper, forming a tight, sway-proof joint without gussets or sway braces. Balanced strength resists overloading and rough use. The Wedge-Lock principle is an exclusive feature, available only in Berger Steel Shelving and Storage Equipment.



The heavier the load— The tighter the joint.



2 ***No Obstructions to Impede Materials Movement***

Wedge-Lock shelves, bins and racks are clear and easy to use. Gussets and sway braces are eliminated completely. Wedge-Lock Shelving lets you get stock out of bulky, inconvenient containers and into open, easy-to-get-at shelves and racks. It keeps its mobile materials handling partners on the go . . . simplifies handling of your moving inventories . . . accommodates items of all sizes from buttons to bar stock. Include Wedge-Lock Steel Shelving in your materials movement plans and enjoy a smoother, more economical material flow, better stock control plus higher efficiency from all your materials handling equipment.

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REPUBLIC STEEL CORPORATION
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WEDGE-LOCK STEEL SHELVING AND STORAGE EQUIPMENT

CONVERTIBLE STEEL SHELVING • FLEXI-BILT STORAGE UNITS • TOOL ROOM and SHOP EQUIPMENT
STEEL LOCKERS • STEEL OFFICE EQUIPMENT

ROSS HEAVY DUTY LIFT TRUCK

CUTS HANDLING COSTS 50% for The Imperial Desk Company, Evansville, Indiana

All lumber used in the manufacture of Imperial's well-known quality office furniture is handled by a Ross Lift Truck. Over a period of two years, this machine has consistently moved and stacked this lumber at a saving of *50% of former cost!*

Arriving at the plant via rail or truck, the packaged lumber is unloaded, stacked in the yard for air-drying then transported to the mill. These operations are accomplished by the Ross in a fraction of the time required by former handling methods.

This is another of the many examples of what Ross Lift Trucks can do for you. Why not get all the facts about Ross?

Rely On ROSS

THE ROSS CARRIER CO.

280 MILLER STREET, BENTON HARBOR, MICHIGAN, U.S.A.

Direct Factory Branches and Distributors Throughout the World

age forward stock area where the order is completed with the addition of the full package stock items.

One of the photos shows the take-off point for the bin merchandise. The scale at one side of the gravity roller line is of 1000-pound capacity, and the scale platform consists of a section of gravity rollers. The weight is entered opposite to the freight classification on the packing ticket. Packages discharged from the overhead slat conveyor are halted for weighing (they are not lifted), and then continue on the declining gravity line. At the end point an operator places the packed bin merchandise and the accompanying order sheet on a four-wheel trailer.

Pallet Racks, Two Pallet Sizes

The subsequent order selection procedure for full cases is similar to that described for open stock merchandise. The trailer is hooked to the drag chain that circles the full package forward stock area. Departmental cards with bold-face block letters are inserted in a card rack, and the lines of merchandise here are likewise laid out numerically. Operators add the full packages from pallet loads that are arranged on racks.

The pallet racks serve a vital purpose in this part of the operation. Because of the thousands of items carried, solid tiers cannot be maintained of any one type or size of merchandise, nor is this desirable from the standpoint of turnover. By use of the racks the largest possible variety of palletized items is stored in a given square footage of space. One pallet load rests on the floor within the rack, the second pallet load atop the stringers. With the upper pallet load resting on the rack, as shown, individual boxes can be removed from the lower tier. At the same time vertical space is utilized to maximum advantage within the limits of this order filling operation.

It should be mentioned that only two pallet sizes are used—36″x36″ and 36″x48″. The rack openings

are 42" for the 36"x36" pallets, and 54" for the 36"x48" pallets. This clearance of six inches for each pallet size leaves adequate room for handling individual boxes from the loads. The rack openings in the lower layer are 48" from the floor to the underside of the top stringers.

The choice of two pallet sizes was the result of an exhaustive study. It is well known that a multiplicity of pallet sizes creates problems. The more sizes you have the less you can find a particular size when you need it most. The two sizes mentioned meet our needs for all merchandise that can be palletized.

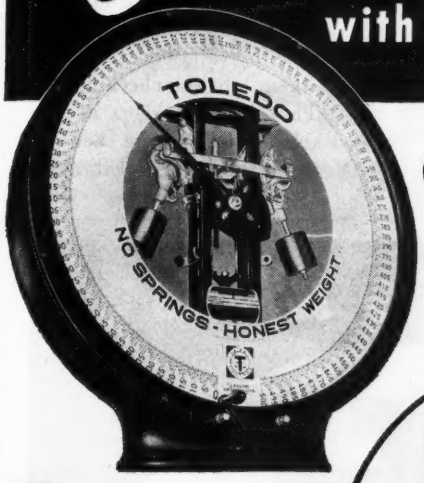
Slight modification of the pallets gives us added flexibility where this might be desirable on account of the irregular contour of some of the hardware items. Hand garden tools are an example. While they can't be stacked squarely on a flat pallet, they *can* be stacked safely on a stake pallet. The stakes consist of steel tubular frames, one at each side, set into the pallet base. The frames are strong enough to support another pallet load on top. The stakes can be removed (or added) quickly as the need arises, without creating a separate category of special load carriers. And the original simplicity of two uniform pallet sizes is maintained.

Drag Chains Do The Hauling

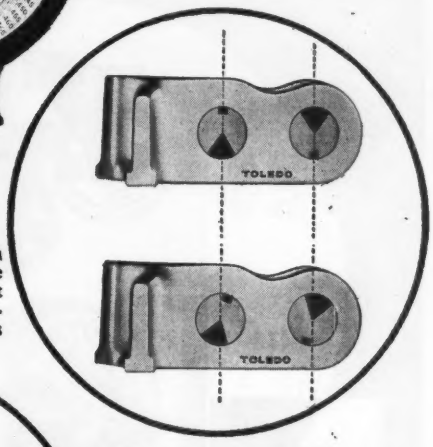
Here are other points that illustrate how careful planning made for simplicity of procedures and ease in handling. The pallet racks are so laid out (within and on both sides of the drag-chain) that the stock clerks in any aisle do not walk more than 40 feet from a trailer to a stock location. This contributes importantly to speedy order filling. More, order clerks, both in the bin and in the full package areas, assemble orders only in their respective departments. They are thus intimately familiar with the stock locations, which has a bearing both on correctness and speed in filling orders.

Another factor that makes for an easy operation is that we use as many 36"x36" pallets in the full

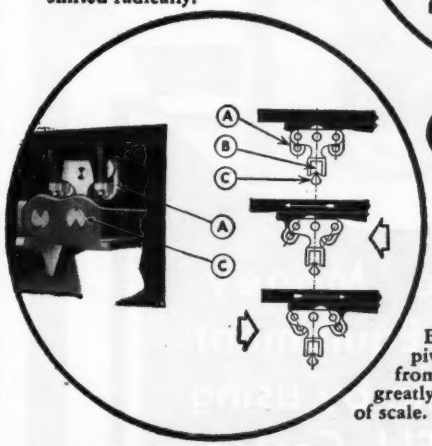
Control Costs with TOLEDO



1 EXCLUSIVE
TOLEDO DIAL with Full Floating Double Pendulum Mechanism
. . . maximum accuracy and dependability in automatic weight indication.



2 EXCLUSIVE
PIVOTS Interchangeable and Self Gauging
assure that original accuracy can be maintained throughout scale life. In illustration, note that knife edge position remains unchanged, even when pivot is shifted radically.



3 EXCLUSIVE
Double Parallel Link PLATFORM SUSPENSION
absorbs side impact, Guards Accuracy. Cut-away corner shows platform is supported by freely hung, parallel links. The suspension links (A) take up all horizontal movement. Bearing (B) resting on pivot (C) never moves from center line . . . adds greatly to long-life accuracy of scale.

Get the *closer cost control* you need today . . . with TOLEDO all the way! Whether it's weighing, counting, force-measuring, batching or testing . . . look to Toledo, Industry's No. 1 Scale for accuracy, speed and long-life dependability. Send for new bulletin No. 2020. Toledo Scale Company, Toledo 12, Ohio.

TOLEDO
HEADQUARTERS FOR SCALES

package forward stock area as possible. The purpose here, too, is to hold man-travel to a minimum. Every time one foot of walking is eliminated (as compared with a 48-inch-wide pallet) one foot of needless movement is saved. The clerks are not tired by extra walking, and the resultant compact arrangement gives more storage capacity. In a large building such as this excess walking would soon add up to many miles. In our planning, methods were designed so that all effort would be directed toward the end of maximum unit production per manhour with the least amount of physical exertion.

The order assembly trailers are propelled around the closed circuit to a point adjacent to the shipping department. The loaded units are uncoupled by an operator who shunts them into the checking station. The checked orders are labeled and the trailers are then advanced into the proper location for shipping. In the summary of the material flow it was earlier stated that the truck and rail shipping platforms are continuous in the north-east corner of the building. Quick loading is a result of this compact layout. The bills of lading are written, and the merchandise is then checked into truck or trap car. (There is no order assembly in the shipping department.)

We have now followed an order from its starting point to the shipping room. It will have been noted that the stock trucks are propelled progressively by the two drag-chains through (a) the bin stock locations and (b) the full package area, with the packing conveyor for bin merchandise connecting the two lines. Operators are not exerting themselves pushing trucks, but are concentrating on the job of filling orders while the drag chains are doing the hauling job. The path of stock truck travel does not vary, and hence congestion is avoided and neatness and plant safety are promoted.

The catalog number system, numerical layout of lines, departmental cards and "open" sided stock trucks all contribute to dispatch and correctness in order filling. The division of the merchandise into two main groups simplifies the handling procedure throughout, which is also aided by the layout of the facilities for stock selection, packing and weighing. With incidental physical effort minimized throughout, better personnel relations may be expected through improved working conditions.

Fork Truck and Tractor Operations

Let us now look at the receiving, warehousing and stock replenishing operations. The three spur tracks in the building accommodate 38 freight cars—14 on each of the two for in-shipments and 10 on the one for out-shipments. Full package reserve is maintained north of the north track and south of the south track, with an open stock reserve close to the bin section. Arriving cars are spotted nearest the location where the merchandise will be stored, which reduces fork truck

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and tractor train travel.

Merchandise is palletized at the receiving point, and the loads are assigned to specific aisles and sections. Depending on the distance of the haul, the movement is either by tractor-train or fork truck. The stacking height is 12 feet to the top of the load, or three pallets high.

Perpetual inventory is maintained. An inventory control ticket is attached to each pallet load. The form is made out in duplicate to show the aisle, section, description of the merchandise, the stock number with department letter, how the item is packed, and the number of packages per pallet.

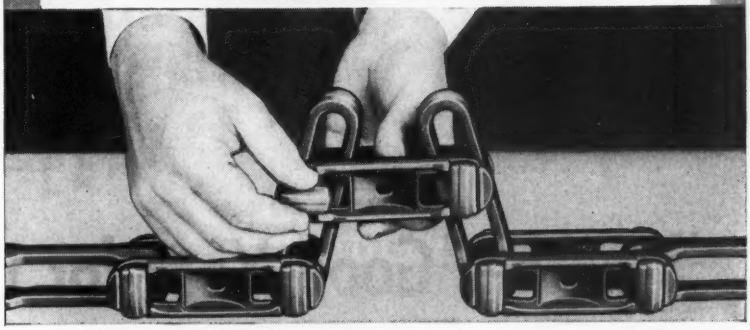
The duplicate is attached to the merchandise and the original goes to the inventory control department, which records the stock as to item and location. When original package merchandise is to be withdrawn, the stockman makes out a requisition. Stock control notes the location of the goods on the form, which is then given to the fork truck operator in the respective area. He detiers the pallet loads, runs them to forward stock and

ODD-SHAPED items are handled in quantity on pallets.

stacks them in the location indicated. The operator detaches the inventory control ticket from the transferred loads and sends it, together with the requisition form, to inventory control. The stock moved is then deducted from the stock recorded, thus giving an exact inventory of the original package merchandise in reserve. This also describes the procedure for replenishing open stock bin merchandise.

(Turn to page 68)

A *New* CONVEYOR CHAIN



WEBB X-458

- CANNOT TELESCOPE
- WILL NOT COME APART
- GREATER FLEXIBILITY ON VERTICAL BENDS
- INTERCHANGEABLE WITH REGULAR 4″ CHAIN
- ULTIMATE STRENGTH 48,000 POUNDS

Patented X-458 Chain is another triumph in the Jervis B. Webb Company 3-decade history of pioneering in the development of better conveyors.

Thoroughly tested in service, it has proven ideal for overhead, floor type or drag line conveyors.

X-458 Chain cannot telescope or disassemble in service; eliminating that source of damage to conveyor drives. Individual links are stiffer and stronger, yet this chain provides more flexibility in vertical bends.

Drop forged from high carbon steel of 85,000 to 95,000 psi tensile strength, this chain has an ultimate strength of 48,000 pounds. It has exceptional ability to withstand shock loads and is unusually resistant to corrosive and abrasive action.

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J. H. W. Conklin
Clark Equipment Co.

First Vice President
J. G. Bucuss
Acme Steel Co.

Second Vice President
J. P. Lawrence
American Monorail Co.

"Another Good Year for the Institute"

J. H. W. Conklin, J. G. Bucuss and J. P. Lawrence are the newly elected officers of the National Material Handling Institute. Suggestions made for new projects at the annual meeting are given in report.

THE annual meeting of the National Material Handling Institute Inc. was held at the Warwick Hotel, Philadelphia, January 14. The date and place enabled members to attend the Material Handling Exposition. Forty representatives were at the Institute gathering.

Among important business was the election of the new officers and chairmen of the various product sections. The new officers are as follows: president, J. H. W. Conklin, Clark Equipment Co.; first vice president, J. G. Bucuss, Acme Steel Co.; second vice president, J. P. Lawrence, American Monorail Co. R. Kennedy Hanson continues as secretary-treasurer.

The product sections announced the selection of their new chairmen. They are: casters, W. G. Reycroft, The Bassick Co.; conveyors, L. C. Backart, The Rapids-Standard Co.; electric accessories, G. J. Berry, The Electric Products Co.; electric hoists, F. F. Seaman, Robbins & Myers, Inc.; electric industrial trucks, W. A. Meddick, The Elwell-Parker Electric Co.; floor trucks, E. C. Hamm, Service Caster & Truck Co.; gas trucks, J. H. W. Conklin, Clark Equipment Co.; hand lift trucks, G. G. Raymond, Lyon-Raymond Corp.; motorized lift trucks, W. C. Stuebing, Lift Trucks, Inc.; pallets, containers and auxiliary equipment, L. West Shea, The Union Metal Mfg. Co.; and strapping, J. G. Bucuss, Acme Steel Co.

1948 a Good Year for the Institute

In his annual report, President Samuel W. Gibb stated that 1948 had been a good year for the Institute, and that its position was better than a year ago. Touching on the chapter program, Gibb said that it had been difficult to deal with, and that the organizations had been spontaneous on the part of the people responsible. The program had been progressive and could be considered successful, according to Gibb, who concluded that the chapter phase was one of the most constructive items on the program of the national group.

J. W. Wunsch, of the Silent Hoist & Crane Co., reviewed the chapter activities and discussed the possibilities of establishing chapters as forums for material handling discussions around the United States. He cited the meeting of the Chapter Advisory Board as a step towards establishing a national organization. Wunsch referred to the organization of the American Material Handling Society and the Institute's offer to assist and support it. Three advisory board members from the Institute are to act as incorporators.

Job Classification Suggested

J. G. Bucuss explained the need for an enducational program and suggested the gathering of information for a handbook which would show what individual products will do. Three directors were appointed to begin research on the subject.

L. E. Nivling, of the Lewis-Shepard Products, Inc., pointed out that the Institute might well develop and define a job classification or profession for the material handling engineer.

Following other business, the meeting was adjourned to hear a talk by C. H. H. Weikel, manager commercial research, Bethlehem Steel Co. It was entitled, The Steel Outlook for 1949.

News From The Sales Field

KINCO, INC., Cambridge, Mass.: This company has been appointed by The Mar-Rail Conveyor Co. as a distributor of Flo-Table, a stock model belt conveyor. Kinco's distributorship covers the states of Massachusetts, Maine, New Hampshire, and Vermont.

THE Glenn P. Crissman Co. has completed a quarter of a century of service in material handling equipment in the Detroit area. The company has progressed from its model establishment in 1924 to its present yearly volume of $1,000,000, Glenn P. Crissman, the founder, said.

MANFRED SCHUELER, Editor of FLOW Magazine, will be the speaker at the March 21 meeting of the Detroit Chapter, Material Handling Institute. The title of his talk will be, An Economic Aspect of Material Handling. Schueler will cite certain case histories in support of the main point of his talk.

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It's the best hardwood pallet on the market! Our rigid inspection assures uniform quality in every RAZORBACK Brand PALLET—they give you long service with low maintenance cost—yet our volume production enables us to compete with ordinary pallets.

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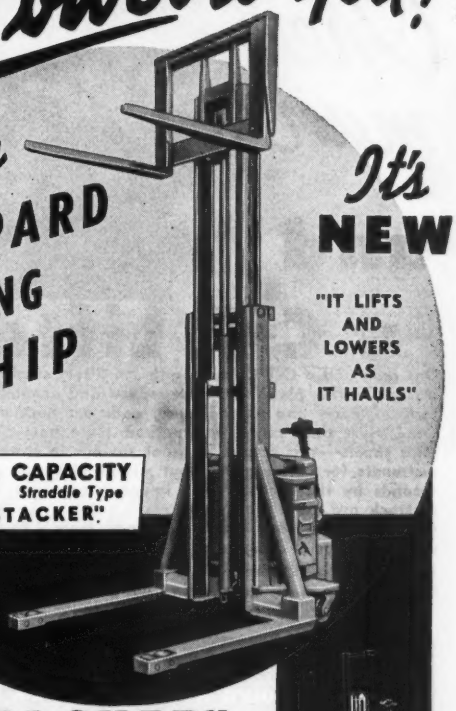

4000 LB. CAPACITY
Telescopic Straddle Type
"JACKSTACKER"

"JACKSTACKER"
ELECTRIC TIERING TRUCK

Capacities to 4000 lbs. No Similar Type Truck Carries 4000 lb. Pay Load. *Load always over Wheels*

- TO MOVE AND STACK UNIT LOADS on all skids and pallets. 4 types: Straddle; Counterweight; Open end Base; Platform.
- Telescopic, High Stacking feature (available all models) allows easy passage under door frames and other obstructions.
- Takes Much Less Room . . . and light dead weight of "Jack-Stacker" makes it ideal where floors will not support Fork Trucks or cramped quarters make them impractical. The "Jack-Stacker" means NARROWER AISLES for you.
- All Controls in Handle Head — 2 speeds forward and reverse, lifting, lowering, horn and lock, plus instant smooth-action electric brake, constantly applied type. Controls operate with handle any position. No need to halt "JackStacker" to raise or lower carriage. No similar type truck has this basic advantage. "It lifts and lowers as it hauls".
- Master Drive Unit, mounted on articulated linkage, gives good traction over ramps, sills, uneven floors. Only takes 20 minutes to change Master Drive Unit assembly.

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One man and a C-F Lifter...

One man and a C-F Lifter handle the sheet steel stock in and out of storage in this plant with ease, speed and economy. C-F Lifters can pick up, carry and unload more loads per hour using less man nad crane time than any other method. Note how closely a C-F Lifter piles sheets—this results in great savings in storage space. Jaw adjustments for carrying different widths of sheets are made in a few seconds by the operator—an important feature when varying sizes of stock are used.

C-F Lifters are made in sizes to handle from 2 to 60 tons in standard and semi-special designs.

Write for the bulletin "C-F Lifters." It illustrates the many cost saving advantages of these lifters.

HANDLE SHEETS with C-F LIFTERS

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THE Material Handling Section, Detroit Chapter of the American Society of Mechanical Engineers, will hear Oscar Johnson of the Kaiser-Frazer Corp. at the March 8 meeting. He will speak on personnel and general set-up of material handling as a department in an industrial plant.

MAINTENANCE of Material Handling Equipment was the subject of two talks given before 92 members and guests at the February meeting of the Northeastern Ohio Chapter, Cleveland. Speakers were L. Russell Astie, planning engineer, maintenance department, Jones & Laughlin Steel Corp., and C. B. Risler, co-ordinating industrial engineer, Westinghouse Electric Corp., East Pittsburgh. A question and answer period followed the talks.

C. F. KELLS, secretary of the Electric Industrial Truck Association, will speak before the Central New York Chapter, Syra-

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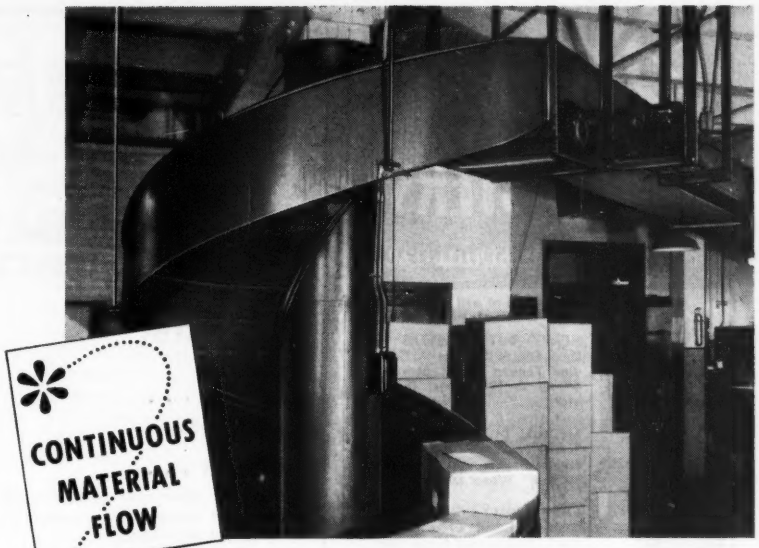
cuse, at its March 22 meeting. The subject, Establishing Cost Analysis Systems for Material Handling Systems.

INFORMATION on the Material Handling Conference sponsored by Purdue University and the Indiana Material Handling Society was not available at press time. A representative of FLOW Magazine was at the conference, and a report will be found in next month's issue. The event was held on the Purdue campus, February 21 and 22.

THE steering committee of the Material Handling Institute Chapter groups has recommended that the groups be amalgamated into a national organization to be known as the American Material Handling Society. The national officers and advisory board from MHI would function mostly on matters of policy and overall uniformity very much the same as the present Advisory Board. The steering committee consists of R. N. Burgess of Detroit, W. W. Phillips of Indianapolis, and Irving Footlik of Chicago.



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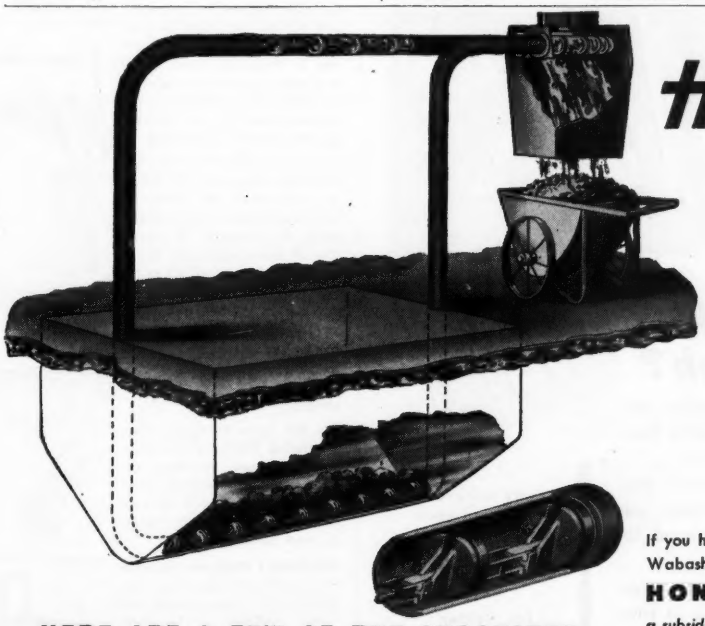

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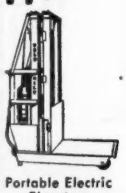

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MINIMUM STANDARD SPECIFICATIONS FOR WAREHOUSE OR RETURNABLE WOODEN PALLETS

After 15 months of research the National Wooden Pallet Manufacturers Association agreed on minimum standard specifications for wooden pallets, given here. Covered are thicknesses of pallet parts, species and moisture content of lumber, tolerances, methods of pallet fastenings, and related details of construction and design.

A—General Considerations

It is recognized that pallets fall into three general groups, i.e., Expendable, General Purpose, and Special Purpose. (Expendable pallets are not considered in the specifications.—Ed.)

SPECIAL PURPOSE PALLETS may be of any design suitable for the product to be carried. Their design and construction are also a matter for agreement between the pallet manufacturer and his customer.

These specifications, then, are meant to be a guide only in the construction of pallets for general use in warehousing and shipping. IT MUST ALSO BE BORNE IN MIND THAT THESE ARE MINIMUM SPECIFICATIONS.

B—Types, Styles and Designs

The most common designs of wooden pallets are:

(1) TWO-WAY pallets, which permit the entry of forks from two sides only and in opposite directions.

(2) FOUR-WAY pallets, which permit the entry of forks on all four sides.

(3) EIGHT-WAY pallets, which permit the entry of forks on all four sides, and from the angle of all four corners.

There are two styles of wooden pallets, and they are:

(1) SINGLE-FACE pallet, which has only one deck as the top surface.

(2) DOUBLE-FACE pallet, which has both top and bottom decks, and which comes in two different designs, viz.

a—Reversible, which has identical top and bottom decks, and upon which goods may be stacked on either side.

b—Non-Reversible, in which the top and bottom decks have different openings, and upon which goods may be stacked only on the top deck.

There are three types of wooden pallets, and they are:

(1) FLUSH STRINGER, a pallet in which the outside stringers are flush with the ends of the deck boards.

(2) SINGLE WING or AIRPLANE, a pallet in which the outside stringers are set inboard a number of inches on the top deck, while the stringers are flush with the ends of the bottom deck boards.

(3) DOUBLE WING or STEVEDORE, a pallet in which the outside stringers are set inboard of both top and bottom deck boards to accommodate bar slings for handling the pallet.

C—Nomenclature

DECK BOARDS are the boards which make up the faces of a pallet, and which either carry or rest upon the goods packed thereon.

STRINGERS are the wooden runners to which the deck boards are nailed, and which serve as a spacer between the top and bottom decks to permit the entry of mechanical handling devices.

POSTS or COLUMNS are square or round wooden parts or other materials employed on some 4-way pallets and all 8-way pallets in place of stringers, and serve the same purpose.

D—Definitions

In speaking of pallet sizes, dimensions shall always be stated in inches, and the LENGTH shall always be designated first before the WIDTH.

TABLE NO. I

MINIMUM LUMBER REQUIREMENTS FOR CONSTRUCTION OF PALLET DECKS

Stringer Length Inches	Deck Spacing Single-Face OR Double-Face (Reversible) 1″	1½″	2″	2½″	3″
32	28	26	24	24	23
34	29	28	26	24	24
36	31	29	28	26	25
38	33	31	30	28	26
40	34	33	30	30	28
42	36	34	32	30	30
44	38	36	34	32	30
46	39	37	34	34	31
48	41	39	36	34	33
50	43	41	38	36	34
52	44	42	40	38	36
54	47	44	41	39	36
56	50	47	43	39	38
58	52	48	45	41	39
60	52	49	46	44	40

TABLE NO. II

MINIMUM LUMBER REQUIREMENTS FOR CONSTRUCTION OF PALLET DECKS

Stringer Length Inches	Deck Spacing for Bottom Deck of Non-Reversible Pallets 1″	1½″	2″	2½″	3″
32	16	16	16	16	16
34	17	17	17	17	17
36	19	19	19	19	19
38	20	20	20	20	20
40	22	22	21	21	20
42	25	25	23	23	22
44	25	25	25	25	25
46	27	26	25	25	25
48	29	28	27	26	25
50	30	29	29	28	27
52	32	31	29	29	28
54	34	33	32	31	30
56	35	34	33	32	30
58	37	35	34	34	32
60	39	37	35	34	33

The WIDTH shall always be the dimension parallel to the top deck boards.

E—Species

Groups I, II, III and IV woods are equally acceptable on a performance basis for wooden pallet construction according to the customer's desires.

Lumber used in pallet construction shall be free of decay, and free of knots with an average diameter greater than one-third of the width of the board. No piece shall contain any defect which would materially weaken the strength of the piece, or hinder its proper fastening.

The most common species employed for pallet construction in each of these groups is as follows:

Group I

Aspen (popple)	Fir, white
Basswood	Magnolia
Buckeye	Pine, jack
Butternut	Pine, lodgepole
Cedar	Pine, ponderosa (western yellow)
Chestnut	Pine, red (Norway)
Cottonwood	Pine, sugar
Cucumbertree	Pine, white
Cypress	Redwood
Fir, alpine	Spruce
Fir, balsam	Yellow poplar
Fir, noble	

Group II

Douglas fir	Larch (tamarack)
Hemlock	Pine, southern

Group III

Ash, black	Sweetgum (red gum)
Ash, pumpkin	Sycamore
Blackgum	Tupelo, water
Elm, white	
Maple, soft	

Group IV

Ash, white	Hickory
Beech	Maple, hard
Birch	Oak
Elm, rock	Pecan
Hackberry	

F—Moisture Content

Wooden pallets may be manufactured of either seasoned or unseasoned lumber. In the manufacture of pallets seasoned lumber shall be considered as that which does not exceed 20% moisture content at the time of shipment. Unseasoned lumber is that which exceeds 20% moisture content at the time of shipment.

G—Deck Boards

The edge boards of the top and bottom decks shall not be less than 5⅝" wide. The balance of the deck boards may be random-width stock. However, no deck boards shall be less than 3⅝" wide.

The structural strength and life-span of a pallet are dependent on the lumber content of the top and bottom deck boards. There are two factors in specifications governing this, namely: (1) the amount of spacing between deck boards, and (2) the number of individual deck boards on each pallet face. Therefore, the number of inches of top and/or bottom deck boards, and the maximum individual and total spacing thereof shall be specified in all orders by the purchaser.

The amount of lumber required for the deck boards in the pallet faces shall be as per TABLES Nos. I and II appended herewith.

When pallets are intended for use with hand pallet trucks, the space between the edge boards of the bottom deck and their adjacent deck boards shall not be less than 6¾".

All deck boards shall be smoothly surfaced on at least one side, and shall be of uniform thickness.

The minimum thickness of deck boards shall be as follows:

Load	Thickness
0-2000 lbs.	Not less than ⅝"
2001-3500 lbs.	Not less than 25/32"

Loads over 3,500 lbs. shall be treated as requiring a SPECIAL PURPOSE PALLET.

H—Stringers, Posts and Columns

All pallets shall have not less than three (3) stringers or not less than 9 posts or columns. The minimum dimensions of the stringers shall be 1⅝"

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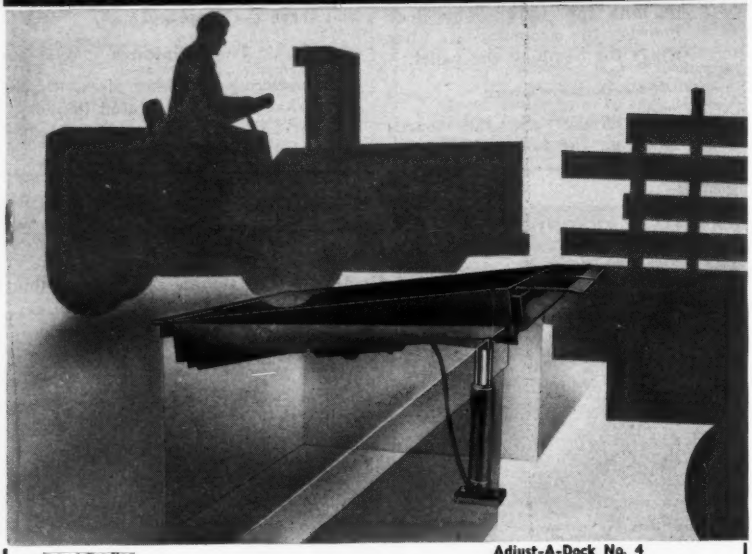

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- Adjustable to existing dock height when not in use, unit becomes a part of the floor. Push button control, speed .7" per second.

Here is the unit for which you have been waiting. ADJUST-A-DOCK is flexible enough for any installation. Saves manpower, cuts time by handling large loads. Simple assembly. Alignment between truck and dock being constantly maintained reduces accidents and breakage. Eliminates bottlenecks by increasing dock traffic capacity.

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thick by 3⅝" wide after surfacing.

Stringers shall be surfaced or smooth sawn at least on the top and bottom edges to uniform dimension. The outside stringers shall be surfaced on the outside face in addition to the top and bottom edges.

I—Chamfering

Unless otherwise specified by the purchaser, only the outside edges of the bottom edge deck boards shall be chamfered as per SKETCH "A" appended herewith. These chamfers shall be at least 12" long, and shall be cut on a 45 degree angle to leave a face adjacent to the chamfer not less than ¼" from the outer edge of the deck board.

J—Tolerances

The overall length and width of the pallet shall be subject to a tolerance of ¼" plus or minus.

Where minimum specifications are specified, no minus tolerances shall be permitted.

K—Fastenings

There are a number of acceptable fastenings for wooden pallets. These are standard nails, annular ring (fettering) nails, drive screws, and bolts and nuts. Bolt and nut fastenings are considered the most durable and most effective method with drive screws and annular ring (fettering) nails being the next strongest types of fastening. The least effective method of fastening for pallets is the standard cement-coated nail.

Pallets should be assembled by nailing and bolting in accordance with the following schedule:

Bolts and Nuts

For bolted constructions, standard steel carriage bolts or car bolts can be used in any one of the three styles—standard, slotted or large head. Unless otherwise specified, these bolts should be furnished in the coarse-thread series, Class 2, free fit.

When ordinary standard commercial carriage bolts are employed, flat washers should be used under the head of the bolt. If car bolts or any other type of bolt with fin construction under the head are used, instead of carriage bolts, then washers are not necessary under the head.

The size of the holes drilled through the deck boards shall be ⅛" larger in diameter than the part itself, and holes drilled through the stringer shall be at least 1/16" larger in diameter than the bolt column.

Square or hex commercial nuts may be used on the bolts. For permanent and enduring use "Teenuts" or "HY-C" nuts are recommended.

If square or hex commercial nuts are employed, the threads should be the same as the bolts, and the nut bearing surface should be washer faced with a combination of flat washers and lock washers, or it should be double chamfered.

When "Teenuts" or "HY-C" nuts are

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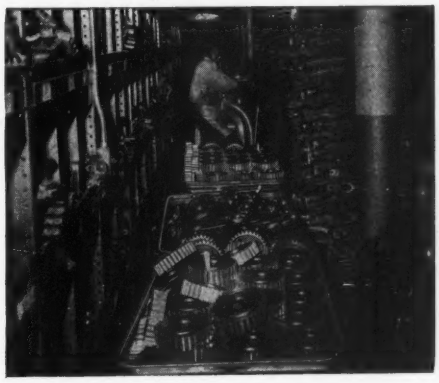

The extreme maneuverability of the Load Dispatcher is one of its many qualities that adapts it so readily to the requirements of busy factories, foundries, warehouses, etc., where floor space is valuable and at a premium. It is handy and a money maker on hundreds of jobs where the aisles are narrow and crowded and the going is tight.

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The Load Dispatcher is a well-built, strong device produced in one of the best equipped factories in America for precision work.

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used, the flat and locking washers required beneath square or hex commercial nuts can be eliminated, due to the construction of these patented nuts. When this type of nut is employed in softwood deck boards or unseasoned hardwood deck boards, no counterboring is required. Where they are employed with seasoned hardwood deck boards, the deck boards should be counterbored not more than 3/32" deep.

The outside edge deck boards shall have at least two bolt and nut combinations at each end, and at least one bolt and nut combination at any center bearing points. All random width deck boards should have at least one bolt and nut combination at each of its bearing points. The correct size of "Teenuts" and "HY-C" nuts for the various pallet loads are as follows:

Load	Size of Nut
0 to 2500 lbs.	5/16"—18
2501 to 4000 lbs.	3/8"—16
Over 4000 lbs.	1/2"—13

Drive Screws

For 5/8" and 25/32" thicknesses of deck boards, it is recommended that a 2½" No. 6 flat head, chisel-point, cement-coated or chemically etched drive screw be employed.

The correct number of drive screws to be employed at all bearing points for the various widths or deck boards is as follows:

3⅝" to 4½" width	2 drive screws
4⅝" to 6¾" width	3 drive screws
6⅞" to 9" width	4 drive screws
9⅛" to 11" width	5 drive screws
11⅛" to 12" width	6 drive screws

When a deck board exceeding 5" nominal width covers a stringer notch, one less drive screw shall be used.

In order to prevent splitting and to provide greater holding power, drive screws shall be staggered. Where possible all drive screws shall be countersunk approximately 1/32".

For flush stringer-type pallets when Groups III or IV woods are employed, the outside edges of the deck boards shall be pre-drilled to receive the drive screws at least 1/32" less than the drive screw shank.

Annular Ring (Fettering) Nails

For 5/8" and 25/32" thicknesses of deck boards, it is recommended that a #10 wire guage x 2½" cement-coated or chemically etched annular ring (fettering) nail be employed.

The correct number of annular ring nails to be employed at all bearing points for the various widths of deck boards is as follows:

	Annular Ring Nails
3⅝" to 4½" width	2
4⅝" to 6¾" width	3
6⅞" to 9" width	4
9⅛" to 11" width	5
11⅛" to 12" width	6

When a deck board exceeding 5" nominal width covers a stringer notch, one less annular ring nail shall be used.

In order to prevent splitting and to provide greater holding power, annular ring nails shall be staggered. Where possible all annular ring nails shall be countersunk approximately 1/32".

When Groups III or IV woods are employed, the outside edges of the deck boards shall be pre-drilled to receive the nail at least 1/32" less than the annular ring nail shank.

Standard Nails

All standard or regular type nails employed for wooden pallet construction shall be either cement-coated or chemically etched box-type nails.

The following size box nails shall be employed for the various thicknesses of deck boards and types of wood:

Thickness	Group I or II	Group III or IV
5/8"	7d	6d
25/32"	8d	8d

The following nail spacing is recommended for the various widths of deck boards:

Width	Nails in Each Stringer
3⅝" to 4½"	2
4⅝" to 6¾"	3
6⅞" to 9"	4
9⅛" to 11"	5
11⅛" to 12"	6

All nails shall be staggered and where possible shall be countersunk approximately 1/32".

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Men In The News

THE appointment of Joe Stoneking as advertising and sales promotion manager has been announced by N. W. Embry, president of The General Box Co. Stoneking's background consists of 16 years in the industrial and sales promotional fields. In his new assignment, he will be responsible for all advertising and promotional activities for the company.

ROBERT M. SNODELL has been named assistant advertising manager by Acme Steel Co. Snodell has been associated with the company since 1934, and has been in the advertising department since his return from army service in 1945.

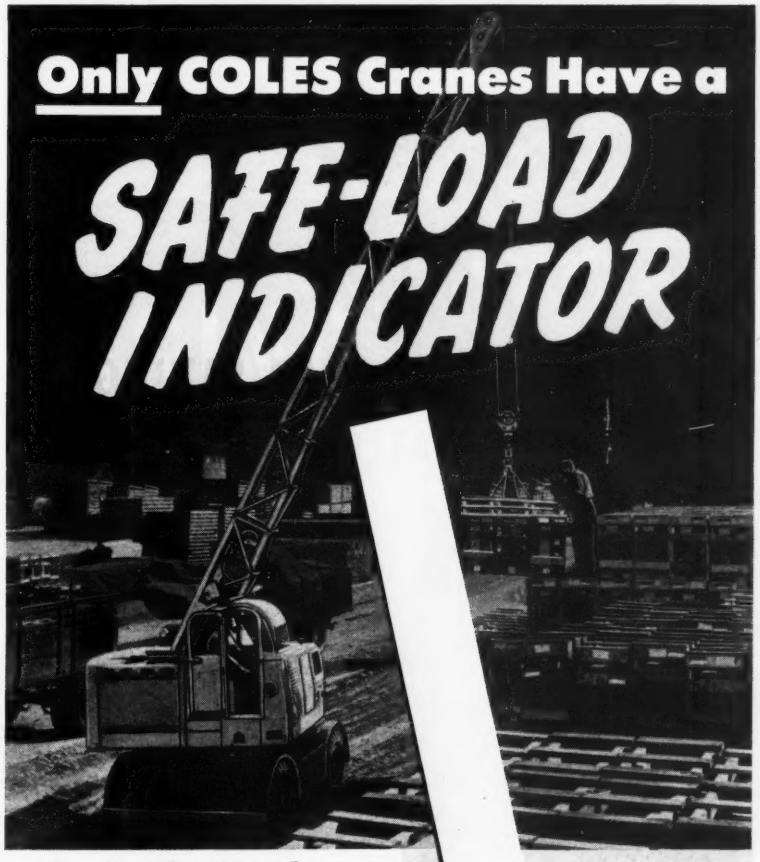
ROLAND WHITEHURST, vice president of The Electric Storage Battery Co., has announced the consolidation of the railway and motive power sales activities of the company. Wm. Van C. Brandt has been appointed manager of this new Exide division to be known as Railway and Motive Power Sales. Brandt previously had been manager of motive power battery sales.

GEORGE M. BASSNETT, executive vice president and sales engineer for Coles Cranes, Inc., comes from Great Britain to America with many years experience in material handling problems. Mobile cranes is one of his specialties. He has traveled all over the continent for Steels Engineering Products, Ltd., of Sunderland, England. He recently organized Coles Cranes, Inc.

HOBART B. HARDEN has been appointed manager of industrial division sales by A. H. Dickmeyer, general sales manager of the Wayne Pump Co. In his new work he will be responsible for the promotion of industrial sales of all types of Wayne-built equipment. Included are industrial hoists, loading dock lifts, industrial air compressors, hose reels, bulk pumps, and power washers. For the past 10 years he has served as secretary and later as vice president of the Globe Hoist Co.

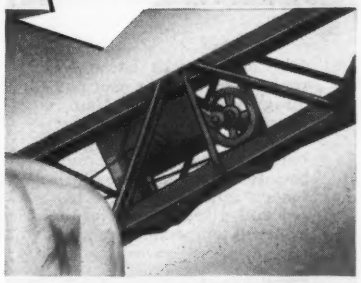
Only COLES Cranes Have a

SAFE-LOAD INDICATOR



Plus - One Man Control
Patented Reversible Steering
Low Maintenance Cost!

Coles *"Safe-load"* indicator provides all around protection to operator as well as to expensive equipment. The unobstructed view from operators cab at front of superstructure furnishes complete visibility, "ONE-MAN" trigger-quick control to all four motions: Hoisting, Swinging, Derricking, Traveling. The four simple controls can be worked simultaneously. Coles Cranes' rugged *"battleship"* construction gives long-life service at lowest maintenance cost—combined with fool-proof operation. Ease of maneuverability, including the Cole patented reversible steering are just a few of the many advantages of the Cole Mobile Crane. "Know-How" gained from 70 years Crane manufacturing experience. Plus ... world wide distribution has made COLES Cranes a leader. Available in several models in capacities 1½ ton to 15 ton. Write us for prices, literature or the name of your nearest dealer. COLES CRANES, Inc., 4307 S. Paulina Street, Chicago 9, Illinois.



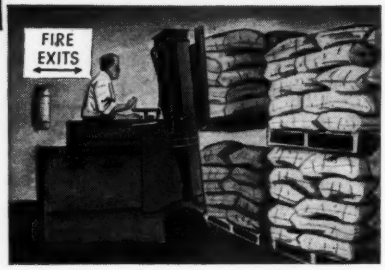
The Safe-Load Indicator

COLES *"Safe-load"* indicator prevents operator from lifting any loads in excess of rated load at any given point of radius. A warning light directs attention immediately to an overload. Current is cut-off automatically if operation is continued.

COLES CRANES
INCORPORATED

WHEN INDUSTRIAL TRUCKS ARE *Battery-Powered* UNIT-LOAD SAVINGS ARE GREATEST!

HIGH-TIERING with clean, safe battery power in this wholesale grocery warehouse *doubled effective storage space,* released valuable space for other purposes. Here, one hundred 25-pound sacks of flour, made up as a pallet-load, move as a unit into surplus and from there to the order selection line.



CLEAN, SAFE, COOL—the *electric* truck features that appeal strongly to another user handling foodstuffs—this time, a canned soup manufacturer. Plant officials say they selected battery-powered equipment because "it is fume-free, presents a minimum of fire hazard and gives off no heat in 'constant temperature' rooms".

Throughout production and distribution, battery-powered industrial trucks assure unit-load handling most dependably, most efficiently—at *lowest cost per ton handled.* Thus America's top industries, with years of owning and comparing, favor *electric* industrial trucks over all other kinds.

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Put this new formula to work. Specify unit loads *to* your plant . . . *in* your plant . . . *from* your plant. And for greatest efficiency in your own industrial trucking, specify battery power.

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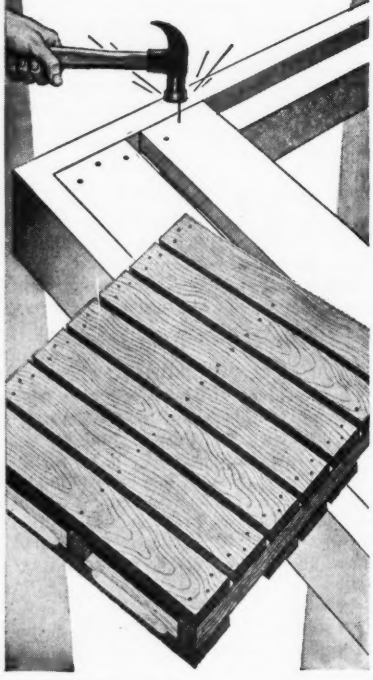

Boards and stringers are held rigidly in a frame during assembly. #6 Helyx drive-screws fix the boards securely to the stringers. These cement coated drive-screws have the non-split chisel point, are hand driven, and staggered. Not until the last screw has been driven is the pallet withdrawn from the frame. This method of construction assures maximum service.

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PACKAGING MECHANICS SECTION

A regular monthly section in which are presented solutions to the problems of efficient filling and handling the boxes, cartons, bags, bottles, cases, etc., used in commerce and industry.

CONTENTS

"Supermarket" PACKAGING Of REPLACEMENT Parts—the extensive application of pre-packing of parts in cellophane containers is uncovering many advantages, among them: speedier order filling, protection against dust and dirt, and eye appeal factors which have a definite merchandising value..... 64

HIGH-VOLUME PRODUCTION IN SUGAR PACKAGING—operations at California & Hawaiian Sugar Refining Corp., Ltd., one of the country's principal sugar distributors. The operation involves five and 10 lb. multi-wall paper pockets, as well as baling into 60 lb. units. Sewing equipment is of special interest..... 70

"Supermarket" Packaging of *Replacement Parts*

Stocking of precision-built, factory-quality renewal motor parts, packaged for users' convenience, saves time and creates customer goodwill for one mid-western electric motor manufacturer.

By JOHN T. SLOAN
Foreman, Renewal Parts Department
The Reliance Electric & Engineering Company
Cleveland, Ohio

RECOGNIZING that it takes modern production equipment, simplified product design, efficient plant layout, and smooth material flow to ring up records in an industry as intensely competitive as electric motors, The Reliance Electric & Engineering Company has since the end of the war embarked on the greatest modernization program in its 43-year history. The company manufactures general-purpose and special-duty motors, generators, motor-generator sets, gearmotors, and adjustable-speed drives.

Benefits To Customers And Manufacturer

Of the major postwar expansion projects now completed by Reliance, the enlargement of its Renewal Parts Department from 3,000 square feet to 4,500 square feet of floor space holds considerable interest, both from the standpoint of material handling and for the packaging economies involved. Aside from the more comprehensive facilities provided to handle smoothly and economically a parts sales volume requiring approximately a $200,000 inventory, the move has been marked by the application of supermarket techniques to serve both producer and consumer at the purely industrial level.

The result? A time-saving labor-aiding "off-the-shelf" service, based on a progressive packaging of replacement parts, that speeds shipment of these essential electrical equipment maintenance items to customers 'round the globe! Departmental operation and procedures are geared to facilitate the dispatch of replacement parts from producer to user in the shortest possible time. With the establishment of a complete supply stock, built up in advance and maintained continuously with packaged parts, emergency shipments can be made on standard items at virtually a moment's notice.

Other notable advantages accruing to the motor user from this newest wrinkle in maintenance parts merchandising include quicker inspection and easier stocking of parts in his own maintenance department; positive protection of parts against dust and dirt; and simplification of purchasing, with consequent economies, when reordering replacements.

ORDERLY ARRANGEMENT of stock bins facilitates selection of parts. Note bottom-stitcher.

ROLLER CONVEYOR transports parts to packing. Brackets are packed in cartons, heavier parts in boxes.

Off-the-shelf shipment of packaged renewal parts also spells a number of important benefits.

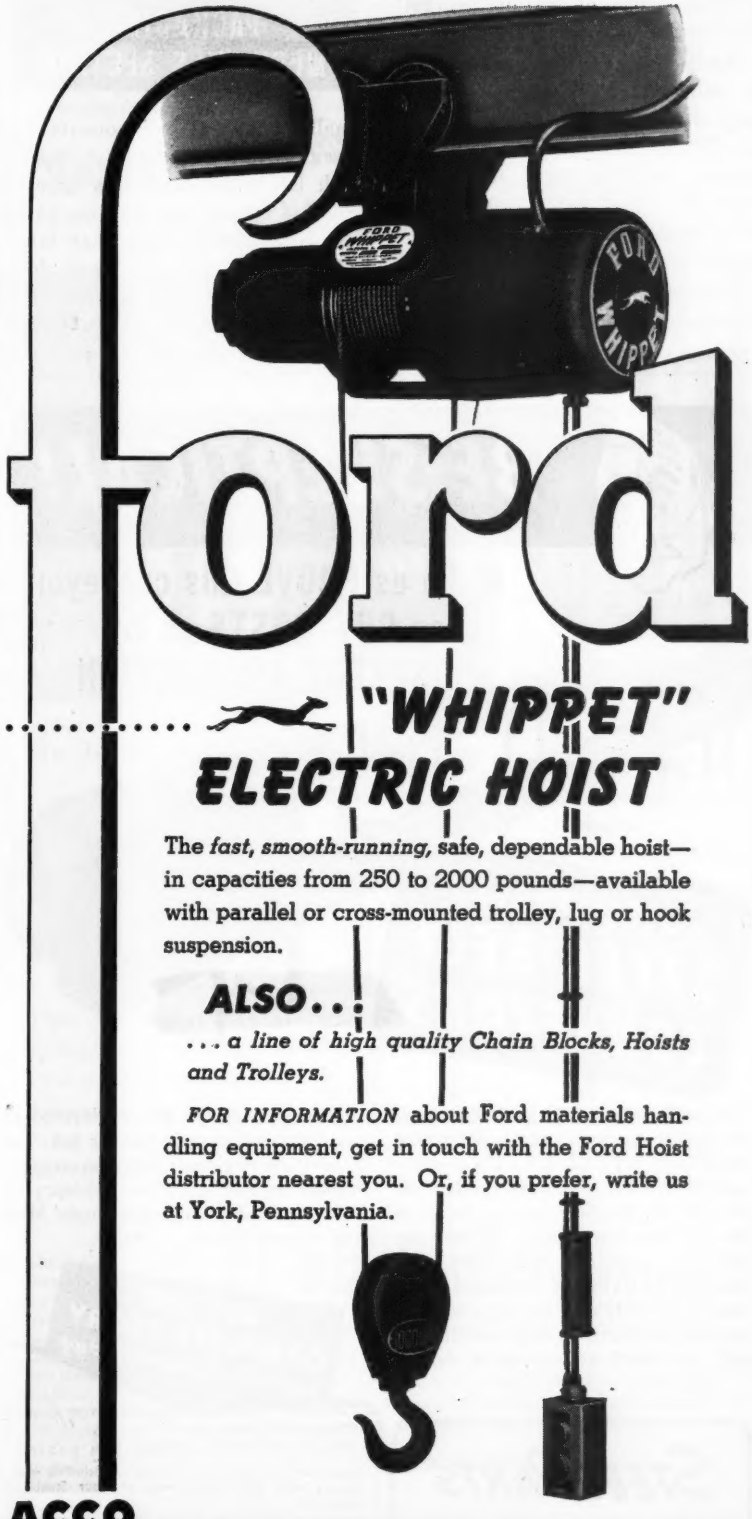
PACKING OPERATIONS take place on tables adjoining conveyor. Hoists move heavy motor parts

Orders are handled, filled and picked for shipment without time-wasting delays or lost motion, expediting initial handling and final delivery of orders. Modern packaging materials, combined with systematic packing routines, promote maximum economy of operation.

TRANSPARENT CELLOPHANE BAGS, folding boxes and corrugated cartons are used for packing.

Ranging in size from carbon brushes and tension springs to armatures and field coils, parts for A-c. and D-c. motors of from 1 to 500 hp. and the company's other principal products are stocked in 21 bays, each 18 feet long, 30″ deep, and 8′ high. Items stocked total between 1,500 and 1,600 according to part number. Orderly, convenient arrangement of these bins enables individual parts to be selected quickly and easily by the stock clerks.

In packaging its renewal parts for stocking and shipping, the company relies on containers of five general types: (1) transparent cellophane bags; (2) folding boxes; (3) corrugated fiberboard cartons; (4) cloth mailing bags, and (5) wooden crates. Each is used to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ELECTRIC HOIST
The *fast, smooth-running,* safe, dependable hoist—in capacities from 250 to 2000 pounds—available with parallel or cross-mounted trolley, lug or hook suspension.
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package parts of certain general size ranges.

Small-size items are packaged in a transparent cellophane bag of duplex construction. These consist chiefly of clamps, brush holders, special stainless steel nuts and bolts, as well as heaters, connectors, coils, contactors and related components for control panels.

Moistureproof, with heat-sealed bottom and anchored coating, this type package effectively handles small structural components by assembly-line operators. Sealed with laminated tape, this type of bag also has an easy marking panel for parts identification that takes ink readily. Reliance uses four different sizes, ranging from the smallest measuring 3x5" to the largest measuring 6x9".

PACKAGING MECHANICS SECTION

Other parts, small yet too large for packaging in cellophane bags, are packed in self-mailing-type folding boxes. A dozen different sizes are used, ranging from the largest of .036" thickness and measuring 7-5/16" long, 1½" wide and 7-5/16" high, to the smallest, which is .024" thick and measures 1½" x 1⅜" x 2". Eight sizes have reverse tuck with locking slits; four are lockless with double flap for packing heavier parts.

Of heavy double-wall construction, the corrugated fiberboard container used by Reliance to pack still larger parts meets both Mullen and Cady tests for bursting strength of 200 p.s.i. When the carton is used as the shipping container, the I.C.C. gross weight limit of 65 pounds applies; but when the carton is overpacked in steel boxes or wooden crates, this limit may be exceeded. Cartons of eight different sizes, ranging from 5"x5"x5" to 8"x17"x8", are used.

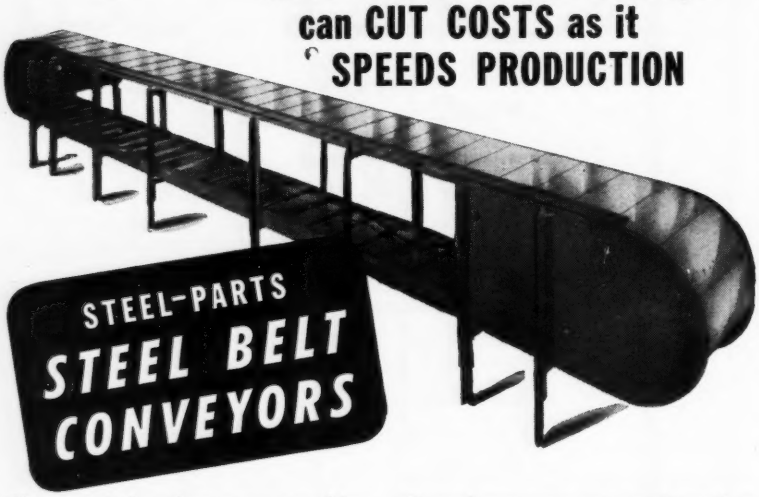
Corrugated fiberboard containers, as with the folding boxes described, prove highly advantageous, promoting savings in handling and shipping, lower first cost, greater availability and added customer convenience. Each container is a completely packaged unit, so that it can be stocked and shipped without further handling.

Stocked in bins, these packages make order-filling a simple matter. Specified items can be picked off the shelf in a jiffy in much the same manner that a housewife shops in a self-service supermarket. This is a tremendous time-saver when it comes to "delivering the goods" in a hurry to meet customer emergencies.

As manufactured parts are received from Reliance plants in Cleveland and Ashtabula, they are packed and stocked. While some operators replenish shelf stock up to required minimum levels, others are kept busy packing parts for current orders. When rush orders arrive, it is no problem to fill them. Such orders get priority treatment. Parts are simply taken off the shelf, a label pasted on the package, and they are ready for inspection,

BE SKEPTICAL!

Make us PROVE this conveyor can CUT COSTS as it SPEEDS PRODUCTION



Yes, we stand ready to present positive proof that conveyorized handling with Steel-Parts STEEL BELT Conveyor will slash costs — step-up production. Mr. H. W. Ziegler, Factory Supt., at the Ed Roos Co., reports efficiency up 30% . . . unit cost down 10% . . . machine capacities increased 65%! And that's only one among dozens of reports testifying to the amazing results obtained with durable, rugged all-steel conveyors, pre-engineered at the factory for your specific job. Let Steel-Parts engineers make recommendations to increase the efficiency of your materials handling methods. Mail the coupon below . . . today.

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weighing and shipment via truck, train or plane.

To surround its renewal parts with a wide margin of protection against damage or corrosion in storage or shipment, special packing techniques are employed. These vary to some degree, of course, depending upon the nature and type of part in question and whether its destination is domestic or foreign. To meet average requirements, the following procedure is standard:

1—Coating machined surfaces with quick-drying, non-oxidizing rust-preventive solution by dip, brush or spray.

2—Wrapping part in paper and sealing with tape.

3—Inserting part in fiberboard carton and stuffing container with excelsior.

4—Wire-stitching bottom and tape-sealing top of carton.

With some of the smaller armatures, special care is taken to make certain that it fits tightly in the carton. The armature rests on wooden blocks at each end, and four triangular-shaped corner wedges are inserted around it in the carton. End blocks and corner wedges are cut from scrap lumber.

Armatures too large or too heavy to be packed in cartons are similarly braced carefully for shipment in wooden boxes, which are constructed to the size required for an exact fit in such instances. Hence, a large, heavy armature is given maximum protection in this manner against damage in shipment as the part is prevented from being moved, turned, or "bounced around" within the container.

For armatures and other parts of special Reliance motors used to power coal-mining equipment, as well as for foreign shipment of standard motor parts, the following packing sequence is employed:

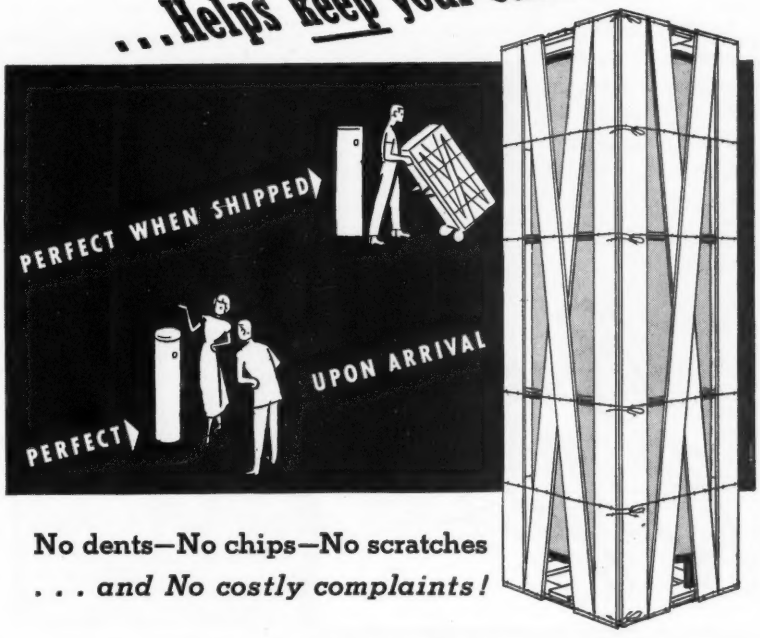
1—Windings are painted with special insulating enamel and exposed machined surfaces coated with anti-rust solution.

2—Commutator is wrapped tightly with corrugated paper, then taped.

3—Complete unit is covered with U. S. Government Grade C cloth

General ★★★★★ *Product Protection*

Helps keep your customers satisfied ...Helps keep your customers!



No dents—No chips—No scratches
. . . and No costly complaints!

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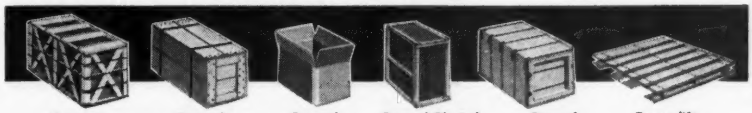
Continental Box Company, Inc.: Houston, Dallas.


General Wirebound Crate | General Nailed Box | General Corrugated Box | General Cleated Corrugated Container | General All-Bound Box | Generalift Pallet

paper, which is really a fabric impregnated with a special wax designed to render the contents waterproof.

4—Part is placed into an air-tight butvar bag, air is removed by vacuum, and package is heat-sealed.

5—Package is placed in metal or commercial wooden box which is stencilled with required markings in letters ½" or ¾" high.

The following procedure is used for export packaging of small mechanical parts up to certain sizes packed in cartons:

1—Rust protection treatment of machined surfaces.

2—Wrapping of part in waterproof paper and imbedding it in moistureproof shredded parchment paper.

3—Placement of part in carton, which is tape-sealed.

4—Application of Grade C cloth paper.

5—Coating container with amber-colored microcrystalline wax, which complies with U. S. Government compound sealing dip coating specification JAN-P-115.

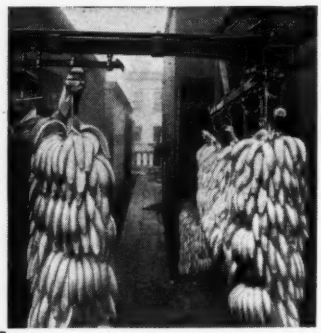
6—To protect Grade C paper and wax film, package is wrapped in transparent wax paper.

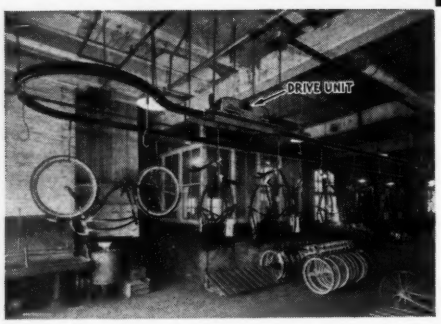
7—Complete unit placed in wooden crate for shipment.

A safe trip for resistors and similar fragile components of variable-speed drives also requires special protective treatment. These parts are often mounted on special panels. The board is wedged in wood on both sides with small posts or blocks to prevent it from moving while in transit.

Reliance expanded its Renewal Parts Department by adding 1,500 sq. ft. of space and making other improvements. Most important of these include rearrangement of storage bins for greater centralization and more convenient accessibility; installation of 70-ft. roller conveyor, which runs from paint spray booth to packing tables; and installation of two 18-ft. craneways, each equipped with one-ton electric hoist, that serve the general packaging and export packing areas.

Bananas or Bicycles





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3. *Zig-Zag Continuous Power Conveyor*—For smooth continuous movement of light loads within confined areas, and the handling of products through degreasers, dip tanks, spray booths, drying ovens, or similar applications.

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AURORA, ILLINOIS, U.S.A.

15,000,000 LBS. OF HARDWARE

(Continued from page 51)

In a large building such as this every foot of travel saved means less effort and time consumed, quicker order assembly and thus better service to customers. Many extra miles would be traveled by tractor-trains and fork trucks if they had to travel longitudinally through the building (around the tracks) in transporting the reserve stock merchandise to forward stock areas. To obviate such wasteful practice, two crossover bridges are placed over each spur track, which expedites the movement of goods in a lateral direction. These bridges are spotted and removed by a crane truck, which is part of the powered material handling equipment employed. The crane truck is also used for unloading such unpalletized

merchandise as long lengths of bar stock and tubing.

Our fleet of fork trucks consists of units of 2000-pound capacity at an 18" load center and with a 131" lift, and several tractors for hauling merchandise from the cars to the reserve stacks. These units are supplemented by two powered hand pallet trucks and five hand pallet trucks.

Method for Empty Shipping Containers

In an operation of this scope (serving some 15,000 hardware retailers), empty box handling could be a problem if it were not planned for as an integral part of the entire operation. Thousands of wooden and corrugated paper containers are made available as the open stock bins are replenished from the original packages. These are of course reused in packing bin stock items. All empty containers are disposed of on an overhead belt conveyor that runs the length of the bin stock section (about 400 feet). This belt discharges the empties in the box shop, which is located along one wall in the packing room. Here all containers are inspected for soundness and repaired when necessary.

The reconditioned or approved boxes are routed via an inclined belt (centrally located in the shop) to either of two overhead gravity roller conveyors. The latter extend at a height of 12 feet from the floor the full length of the box racks, which in turn flank the packing conveyor on both sides. This layout is shown in one of the photos. The box racks slant toward the packers.

From the overhead gravity roller conveyors, the boxes are sorted by an operator (standing on a catwalk) by sizes and placed in uniform rows on the racks. This arrangement gives each packer a full assortment of shipping containers at all times. No packer need spend time looking for a box of a certain size, and the off-the-floor storage of empties makes for neatness and good housekeeping. And the floor areas below the racks are available for normal production needs.

With the methods and equipment described we assemble, check and ship hardware orders aggregating between 14,000,000 and 16,000,000 pounds a month. It is planned to set up time standards for the various categories of orders.

In the almost 100 years of existence of Hibbard, Spencer, Bartlett & Co., our firm has followed a policy of keeping abreast of the times. In doing so, the company has moved several times in the interest of maintaining an efficient operation in order to render the most economical service to our customers. To paraphrase a statement of our Chairman C. J. Whipple from an address he gave: "With this new one-level building we have attempted to meet the challenge of changed conditions. Some years hence I trust that our company will have the vision to continue to make the changes that time is certain to bring about".

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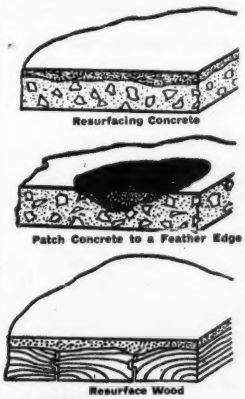
INDUSTRIAL FLOORS



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HIGH-VOLUME PRODUCTION

In Sugar Packaging

At this California plant, over 400,000 five and 10 lb. household bags of sugar are packaged every 24 hours. Multi-wall bags are used exclusively.

TABLE sugar is one of the most widely used food products. The huge nation-wide daily consumption gives a hint of the problems that are involved in its packaging. The California & Hawaiian Sugar Refining Corp., Ltd., Crockett, Calif., one of the country's principle sugar distributors, has installed equipment capable of packaging in excess of four packages in the five and 10 lb. sizes every second during each 24-hour working period. To meet the demand, the company now has in all nine high-speed filling lines in operations on five lb. and 10 lb. sizes. The following describes operations on one five lb. line which is typical of the methods employed throughout.

Multi-Wall Containers for Packaging

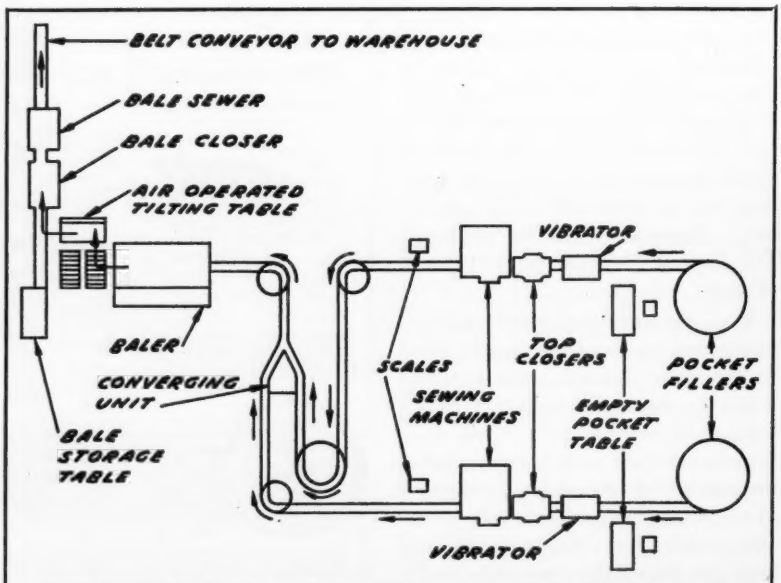
Five-pound multi-wall paper "pockets," or bags, are used. The pocket is constructed so that it assumes a rectangular contour when opened and filled. The folded, flat containers are delivered to tables adjacent to the filling machines at the start of each packaging line. Two filling machines are employed in each line, forming a Y-shaped layout (one machine is located at each of the two branches as can be seen from the accompanying flow sheet). This scheme was necessary because of the lower productive capacity of the filling equipment in terms of pounds as compared with that of the subsequent baling machines which combine 12 consumer units in one shipping unit.

An operator loads the filler by slipping the open end of the bag over an inverted pyramid under a spout. Two clamps on the side of the spout descend and secure the empty unit. The filler is a four-spout rotary-type in which the pocket loading is accomplished on No. 1, pocket filling on No. 2 and No. 3, and pocket release on No. 4. As the loaded bag is released, it drops onto a narrow belt conveyor leading to the sewing machine. The conveyor passes over a vibrating mechanism which settles the sugar so that a uniform bag closure can be accomplished. Immediately preceding the sewing machine, the bags pass through a top folder where two arms descend to tuck in the side gussets of the pocket and a clamping device presses the two sides together for sewing.

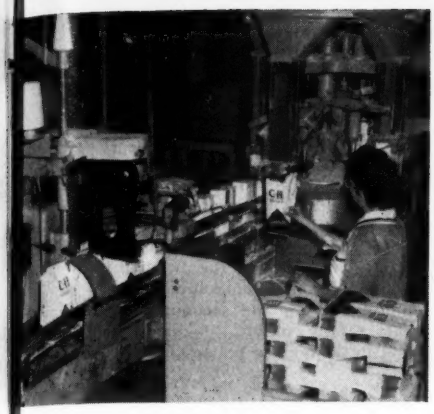
Automatic Sewer—Fast Output

In this position, the filled pockets pass through a belt-type clamping device to a vertically mounted sewing machine. This machine is equipped with a tape feeding device which places two strips of creped tape in position along the top of the bag. When the machine stitches the closure, the paper tape serves as an added reinforcement. The sewing machine accomplishes three things simultaneously. 1. Sews the top of the container. 2. Clips off the excess bag material above the height of the tape stitching. 3. Cuts off the excess tape. This equipment is entirely automatic. A roving inspector periodically loads empty pockets on the table and inspects the machinery. He also check-weighs sample packages to insure proper loading.

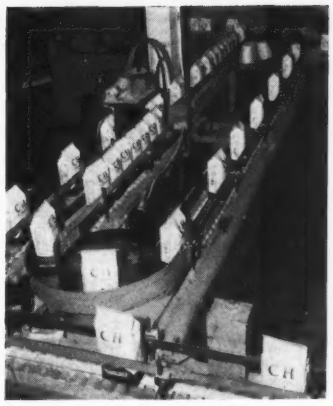
After the sewing operation, the two lines converge onto a single belt. A switching mechanism was provided which allows the production from the two lines to be alternately diverted onto the single con-



FLOW SHEET of Y-shaped packaging line which converges onto the single belt conveyor.



FIVE-POUND CAPACITY paper pockets are being fed into four-position rotary-type filler.



CONVERGING UNIT. Belt conveyors from each of the two filling and sewing units converge into single line feed to baler.

veyor. This belt travels at approximately double the speed of the filling belts.

The loaded containers next pass to the baler which receives the pockets in a vertical position and isolates them in rows of four each. Three of these rows are set up within the magazine of the machine, where a paper bale is slipped over the filling throat and clamped in place at the opposite end of the unit. The operator, by depressing a foot control, actuates a ram within the magazine which pushes the 12 pockets into the bale, giving a shipping unit of 60 pounds. This master container rests on a section of roller conveyor directly adjacent to the machine. To remove the bale, the operator releases the clamps and pushes the container forward onto a table.

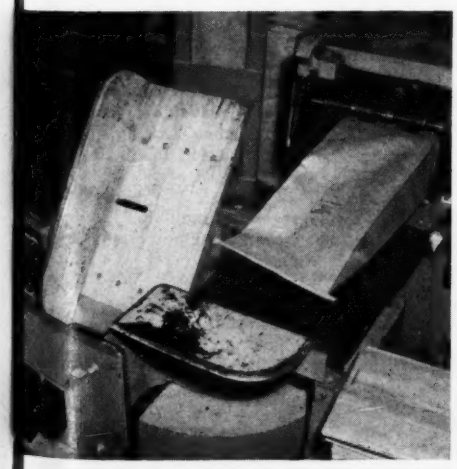
Drag Chain Conveyor to Final Sewing

The table is hinged at one end so that it may be tilted by an air cylinder (the weight of the bale depresses a lever in the table causing it to tip forward). The bale is upended and realigned from a horizontal to a vertical position. In doing so, the bale drops onto a sheet metal slide with side supports. A drag chain conveyor with extending arms moves the bale forward into a large closing device. First the top gussets of the bale are folded in by six mechanical fingers, then the sides are depressed and subsequently held in position for sewing. A wider, reinforcing tape of heavier grade is positioned at the top of the bale and peened over the edges.

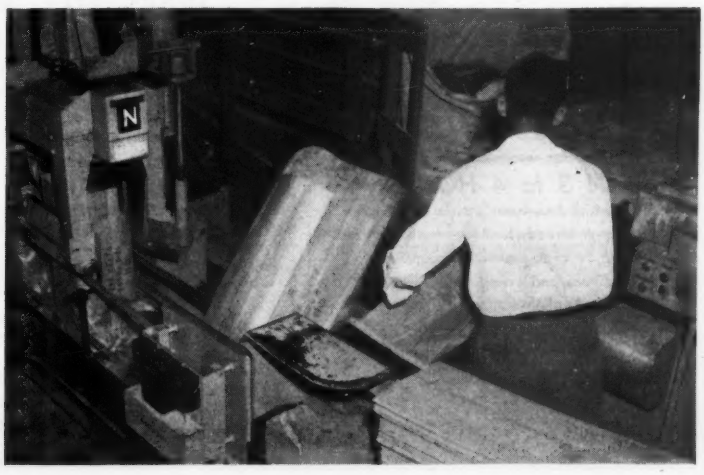
The sewing completed, the machine clips off the excess tape and thread. One major difference between this large machine and the smaller one is that it runs intermittently to save closure material, being set in motion by switches depressed by the approaching bales. The completed bales travel via conveyor onto an extensive system of belt conveyors which dispatch them direct to the warehouse. This conveyor system services all nine of the packaging lines in this department.

Each five-pound pocket packaging line requires only three full-time operators—two spouters for the filler machine and one for the baler. The three operators pack in excess of 30,000 five-pound bags per eight-hour shift, while on ten-pound pockets two operators pack about 15,000 on lines specializing in that size.

PAPER BALE CLAMP on discharge throat of baling machine. Note roller conveyor and tilting table with built-in tripper switch.



BALE CONTAINING 12 five-pound pockets of sugar upended onto closing machine. In the left rear, closer and sewer are visible.



USEFUL LITERATURE

(CATALOGS & BULLETINS)

The publications featured on these pages were written by experts. They are FREE publications. To obtain these use the postcard bound into this issue.

25—Scooter-Loader . . . Arrow Contractors Equipment Co. is offering a brochure on its Scooter-Loader, a powered scoop truck. It is equipped with an eight-cubic-foot bucket and can handle up to 1200 pounds. Included are operation photos, construction features, and specifications. While designed primarily as material handling equipment for construction work, the equipment is adaptable to other industries.

26—Tire-Mounted Crane . . . A two-color pamphlet picturing and describing its all-purpose yard crane, model 22A, is available from the Wayne Crane Division, American Steel Dredge Co. The crane is designed with various attachments and accessories for use as a clamshell, magnet crane, trench hoe, power shovel, dragline, or utility crane. The mailing piece gives specifications and operating features.

27—Welding Cylinder Trucks . . . A complete line of welding cylinder trucks is illustrated in a booklet released by the Adams Mfg. & Supply Co. The units are designed to carry any size welding cylinders in tandem or side by side. Eleven models are pictured and described.

28—Conveyor Belting . . . Data on Lion Paw conveyor belting, transmission belting and safety matting, is contained in a brochure issued by the Buckner Process Co. According to the release, features of the belting include less slippage, long life, less static electricity and wide adaptability. Engineering data on transmission belting and safety matting are included.

29—Steel Belt Conveyors . . . May-Fran Engineering, Inc., is offering a pamphlet describing its steel belt (hinge type) conveyors. General and "blow-up" photos show detailed construction and in-use views. The conveyors are designed for steel mills, stamping and forge shops, ferrous and non-ferrous metal working plants, etc. Also offered is data picturing and describing the company's hydraulic sheet lifter. Specifications are given.

30—Weighing and Totalizing Dry Materials . . . Builders-Providence, Inc., has released a bulletin describing the new Builders Conveyorflo Meter for continuously weighing and totalizing the flow of dry materials. The unit can also be installed for the automatic proportioning and controlling of dry or liquid feeders for secondary ingredients. Many photos, engineering data and drawings are featured.

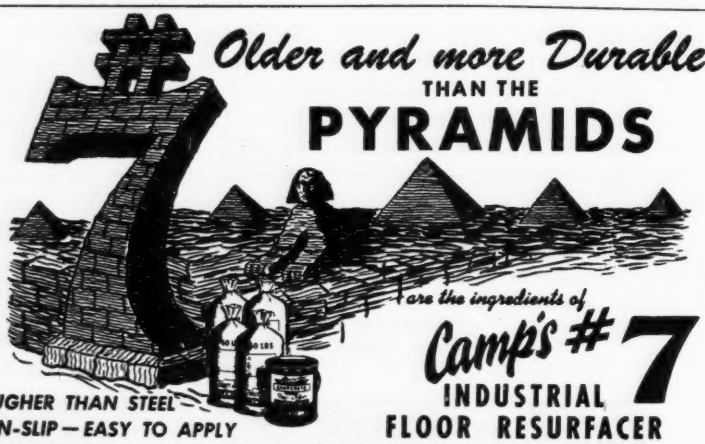
31—Packings for Chemicals . . . Packing for the Chemical Industry is the title of a booklet prepared by the Crane Packing Co. It is designed to give a complete picture of packing requirements for practically all chemical applications. All examples are illustrated, and recommendations are made for specific services and temperatures. A section is devoted to a new packing development which is said to be completely inert to most chemicals.

32—Mechanized Handling Methods . . . The "Case History" issue of the current Material Handling News, published by the Clark Equipment Co., presents detailed analyses of mechanized handling methods in industries of many kinds. The studies cover fork truck installations for handling bottled beverages; building supplies; plumbing equipment; petroleum products; farm machinery; marine warehouse stocks; canned goods; retail merchandise and ceramic products.

33—Truck Comparison Chart . . . The Fairbanks Co. has issued a catalog which lists comparative style numbers of Fairbanks Trucks beside the model numbers of trucks of other well-known manufacturers. Tables are given alphabetically by manufacturer, with the trucks listed in numerical order in each table. The comparisons shown represent those trucks which are most similar in design and construction. Seventeen manufacturers are listed.

34—Pallet Truck . . . The Towmotor Corp. is offering a pamphlet on its new, Model W, battery powered pallet hand truck. With a 4000-pound capacity, it will travel 2.2 mph loaded, and has a lift height of four inches. Lifting speed is five seconds with a full load. Forks are available in lengths of 36, 42, 54, 60, 66, and 72 inches. The pamphlet gives complete operating data, specifications, and includes engineering drawings and photos.

35—Hyster Publication . . . The first issue of a new external company magazine, Lifts, has been released by the Hyster Co. The 36-page publication contains articles and departments relating to material handling performed by various types of the company's industrial trucks.



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No. 7 Industrial Resurfacer sets in about three or four hours — is ready for heavy trucking in 24 to 48 hours, depending on the temperature and drying conditions; and is ready in 24 hours if subject to only foot or light traffic.

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Colors: Natural (dark grey), Dark Red, Dark Brown.
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4 50-lb. bags of powder
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Coverage: 100 square feet about ¼" thick to each Unit.

FLOORING MATERIALS for practically EVERY PURPOSE from COAST to COAST

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36—Float Packaging . . . A guide to the use of interior cushioning material in packaging, illustrated with 39 photographs of products of leading manufacturers in various fields. The colorful brochure shows four basic methods formulated by Army-Navy packaging specifications — Blocking & Bracing, Flotation, Absorbent Pack, and Surface Protection. Manufacturers are invited to use the packaging consultation services of Kimpak representatives when planning improvements in their packaging.

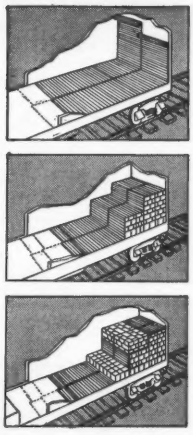
37—Brakemotor Bulletin B 501 . . . It has recently been issued by the Star Electric Motor Co. This 8-page publication describes in detail, with technical data, the construction and operation of these integral brakemotors, individually designed for powering specific equipment. Illustrations show varied "start and stop" applications, and range from high speed bottling and molding machinery to cranes and hoists. A table shows the relationships between torque, brake size, and applicable motor frame sizes.

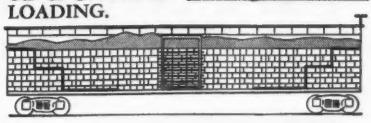
38—Adjust-A Truck and Dock . . . A four-page brochure offered by Rowe Methods, Inc. The "Adjust-A Truck" equipment is a heavy-duty unit which is built into the runway in front of the dock. The truck platform is adjustable through a hydraulic cylinder with a conveniently located push-button control. It is designed for a capacity of 40,000 lbs., with as much as 2/3 of this weight on one side. With "Adjust-A Dock" the loading platform is adjustable to meet the height of the truck floor. The forward edge is equipped with a hinged bridge plate. Both models can be installed in multiple using a single power unit. The brochure shows schematic drawings of both types of units; also "before and after" photos.

39—All-Purpose Gripping Forks . . . A richly illustrated bulletin released by Liftall Corp. A positive control hydraulic system actuates grippers that squeeze to the right pressure for gripping, and limits pressure to avoid crushing. "Positive gripping of the load until the load weight is relieved" is stated as an exclusive feature. One lever on the fork-type truck controls both gripping and lifting operation. The feature stressed is the absence of a load-supporting surface. The numerous photos show the equipment handling material in boxes, crates, bags and steel drums.

40—Conveyor Belt Idlers . . . The Palmer-Bee Co. is offering a booklet describing its line of conveyor troughing and flat belt idlers, both carrying and return types. According to the release, the idlers are lubricated for lifetime use. Charts are given which list the dimensions and diameters of rolls for carrying belts ranging in width

Shippers of cartons using this modern carloading method are FOR it! Once you have tried it, you'll want it, too! It prevents cases from falling into those "voids" or "wells", at either end of the car, caused by jolts a freight car gets during switching or other normal handling. At little cost per car, and only a few minutes' time, shippers can save real money with the FIBREEN METHOD of UNITIZED LOADING.





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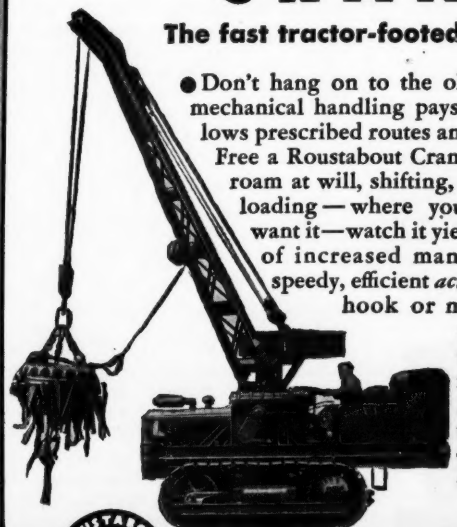
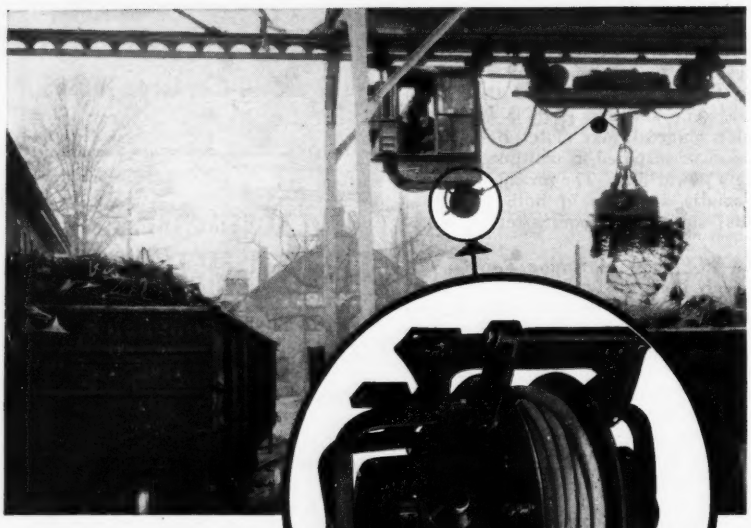
Mechanical handling in your yard pays too—
with ROUSTABOUT CRANES
The fast tractor-footed load-hustlers



● Don't hang on to the old-fashioned idea that mechanical handling pays off only when it follows prescribed routes and methods — indoors. Free a Roustabout Crane in your yard — let it roam at will, shifting, stacking, loading, unloading — where you want it, when you want it — watch it yield pay dirt in the form of increased man hour savings — and speedy, efficient *action*. Loads to 7½ tons, hook or magnet, mounted on wheel or crawler tractors. Ruggedly built for years of overwork. Make your yard contribute to profits, too — get the Roustabout economy facts now.

Write to Dept. C-2.

ROUSTABOUT CRANES
HUGHES-KEENAN CORPORATION
DELAWARE, OHIO, U. S. A.
Load-Handling Specialists since 1904



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APPLETON REELITES

TRADE MARK

Prevents Kinks, Tangles, Breaks In Conductor Cable

Moving electrical machinery operates smoothly and economically when power is supplied through Appleton Constant Duty Reelites. These sturdy, precision-built reels automatically take up and pay out conductor cable.

Operating on spring tension, Appleton Constant Duty Reelites hold cable gently taut, preventing breaks, kinks and tangles. Accidents are prevented, costly delays are avoided, work is speeded—cable costs are held to an absolute minimum.

To assure years of trouble-free service, springs of Reelites are enclosed in dust-tight, grease-filled compartments. Ball-bearings guard against wear, provide smooth, efficient operation.

Appleton Constant Duty Reelites are at work everywhere in industry—on hoists, lifting magnets, cranes, chargers, motor generator sets—an endless variety of machinery requiring flexible power supply. Thousands have profited through the use of Appleton Constant Duty Reelites. Why don't you?

Send for 50-Page Bulletin No. 504, giving complete details on Appleton Constant Duty Reelites, Portable Reelites, and Reelites especially built for air and fluid lines. Or see Sweet's File, page 2a/15.

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from 14 to 60 inches. Line and cutaway drawings show construction details. General and breakdown photos are featured.

41—Material Handling Equipment . . . Over 100 pieces of material handling equipment are pictured and described in Form 30, issued by the Fab-Weld Corp. Most of the units work in conjunction with fork trucks, hand pallet trucks, overhead conveyors and hoists. Included also are skids, racks, pallets, stacking, skid and tote boxes, hand trucks, trailers, bridge plates, hoppers, and special equipment.

42—Strapping Equipment . . . The Steelbinder, a strapping tool manufactured by A. J. Gerrard & Co., is featured in Form 160-13, available from the company. More than a dozen photos show applications of steel strapping and packing material to such items as a motor armature, picture projector, control cables, stamping presses, lighting fixtures, etc. Operating features and specifications are stressed. Also described are seals, strapping, cutters, reels, and complete kits.

43—Battery Charging Equipment . . . A brochure from the General Electric Co. pictures and describes its line of fully automatic battery charging equipment for battery control room installations. It is designed for single and multiple charging of lead-acid and nickel-iron-alkaline batteries. Features of the models are stated: space and operating economy, full automatic operation, protection for operator and equipment. Single-circuit and multiple-circuit charging units are shown. Technical information in table form is given as a guide in selecting the proper equipment.

44—Hand Trucks . . . Two brochures in color are available from the Gleason Corp. on its latest models. One two-wheeler is of tubular welded construction, with a white finish, weighing less than 20 pounds. It is designed for sales floor work. Size: 46″ high, 17″ wide. Five-inch molded rubber wheels are 1½″ wide. Another model is the Welder's Helper, a gas cylinder welding car with four wheels. It is 21″ wide and has two swivel casters for sharp turns. The 15″ x 24″ platform carries both a 9″ and 12″ diameter cylinder 5½″ above the floor. The third model described is a new appliance hand truck, tested for 500 lbs. Its net weight is 53 lbs. It is 54″ high, 27″ wide, and rolls on heavy rubber tires, 10″ in diameter and 2¾″ thick.

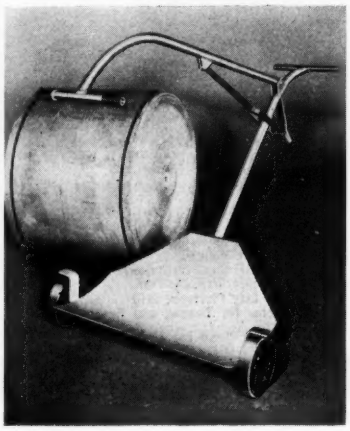
ACME STEEL CO. announced that C. S. Macnair has joined the company as a consultant on product development. Macnair has been operating his own package engineering business, C. S. Macnair & Assoc., Chicago, since 1926. During the war he did special work in connection with the Navy Subsistence Repacking Program.

NEW PRODUCTS

For additional information on these products, write Dept. 5, Flow Magazine, 1240 Ontario St., Cleveland 13, or use postcard bound into this issue.

ROLL HANDLING TRUCK

NP1—The Ironbound Box & Lumber Co. offers a new lift, grip and carry RolTruck. It is designed for handling paper rolls, barrels, drums, kegs and similar items weighing up to 2000



pounds. The unit is available in three standard cradle widths for rolls up to 22, 32 and 40 inches wide. The truck is equipped with six-inch or eight-inch diameter front wheels. Load-holding arm is securely locked around load by a few turns of the locking handle and will not disengage until manually released.

ELECTRIC HOISTS

NP2—Wright Hoist Division, American Chain & Cable Co., Inc., has developed a new series of electric hoists. The line is made in capacities from 1000 to 20,000 pounds. The design incorporates all-steel construction and gear train plus preformed cable and swaged-on cable fittings. Other construction features are: ball bearing, fully enclosed motors; splined connections; grooved steel cable drum; jaw-type brake; rabbeted male and female frame connections; push button controls; roller bearings and safety limit stop.

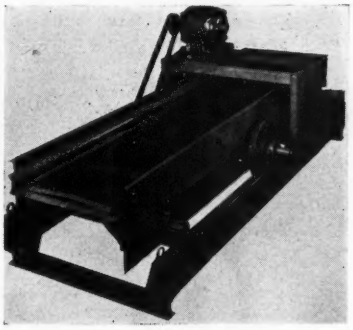
LIFT TRUCK

NP3—The Barrett HT Lift Truck is again being manufactured by the Barrett-Cravens Co. This half-ton model can be employed as a general purpose floor truck as well as a conventional lift truck. It is designed for handling loads up to 1000 pounds. An operator pulls down the bar handle (one stroke) and the load is elevated. A full two-inch lift is provided. To settle the load to the floor, the operator presses the thumb handle release and eases the handle upward. The load is pushed or pulled by using the bar handle. The truck's width of 18 inches adapts it for

use in small areas. Weighing only 108 pounds, it is made with lowered heights of 3½, six, seven and nine inches, and with carrying frame lengths of 36 and 48 inches.

VIBRATING SCREENS

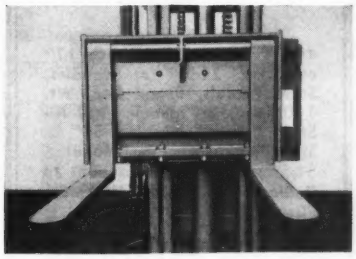
NP4—The Screen Equipment Co., Inc., announces a new line of light-duty vibrating screens. The units are designed to simplify a great number of small



screening jobs, often performed by hand. Any job of separating materials to size, dedusting or reclaiming may be handled with these units. Single and double-deck models are available in 1½ and two-foot widths with three, four, six and eight-foot lengths. Triple-deck models are made in smaller sizes. Screen speeds up to 1150 RPM are available. They will take loads up to 15 tons per hour, depending on the type of material to be screened and the size of the wire cloth openings.

SIDE SHIFTING ATTACHMENT

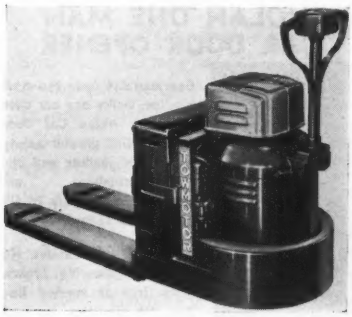
NP5—A side-shifting attachment for the carriage of any of its power fork trucks has been announced by Lewis-Shepard Products, Inc. The attachment is especially valuable when loads must be spotted exactly and when working in tight quarters. Shifting of forks is controlled by a hydraulically operated



"deadman" type lever, located on the operator's cab. The forks can be shifted and held by as much as four inches to the right or left of center position. Adjustable flow valves on the carriage control the speed of the side shifting.

POWERED HAND PALLET TRUCK

NP6—A new battery-powered hand pallet truck has been announced by Towmotor Corp. Major features include rapid lifting of loads; high traction; safety handle with control buttons for either right or left hand operation;



three-point suspension for smooth travel over uneven surfaces; and differential-action trailer wheels. The model also offers an automatic power cut off which, upon release of the control handle, instantly cuts off the power supply to the motor and applies a positive quick-acting brake to the drive shaft.

TACKER AND CLEANER

NP7—A new combination of a tacker with swing-type jaw and channel cleaner is announced by the A. L. Hansen Mfg. Co. Design of the tacker provides for instant disassembly and assembly

3,000 HAND TRUCKS

Unused, 24" W x 60" L Hardwood Handles, Fully Steel Strapped — Barrel Bed.

Wt. 114#

$8.95 ea.

Included are Famous Makes, Farbanks, Colson, K & J, etc.

Brand New Rubber Tires on Above Trucks $2.00 Ea. Additional

Values Up To $30.00

400 Fairbanks Stevedores 17" at Nose, 21½" at Handles, Steel Wheels, Barrel Bed, Wt. 140#—$12.95 each. 400 All Steel Trucks 24" W x 66" L, Strt. Bed, 14" Pipe Handles, $8.95 each. 25% discount to Dealer in Quantities. Write for Photos!

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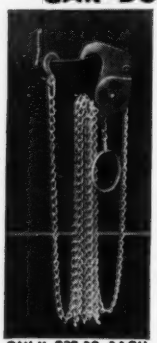

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One man can open the most binding, balky box car door with the Nolan Car Door Opener. Get greater safety . . . speed loading and unloading schedules . . . order an ample supply to fill your needs today!

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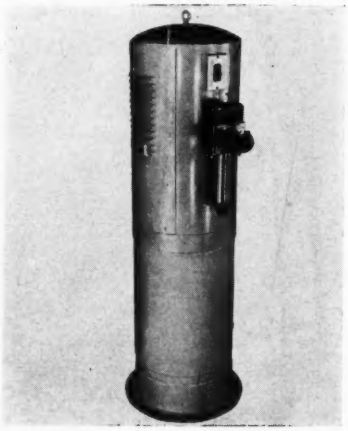
simply by pressing down the cap of the tacker and swinging out the jaw. The channel is thus open at the front for insertion of the channel cleaner. Feeder spring is hooked over a catch at the back end of the tacker and is held until channel is cleaned.

CEMENT AERATOR

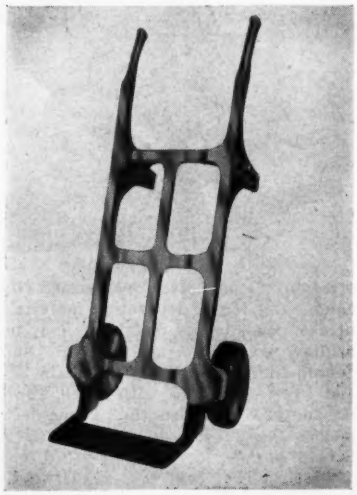
NP8—Designed for full control of the flow and handling of bulk cement under all conditions in a new compact cement aerator developed by the Butler Bin Co. The unit is adaptable to uses in



many other industries. It occupies little more space than a standing man. Complete controls direct air automatically under adjustable pressure to the air jet lines. Dual pressure take-off provides extra air for many other uses around the plant, such as pumping tires, cleaning equipment or operating air cylinders. Two models are available with 60 gallon tanks, one with a displacement of 8.6 cu. feet, the other with displacement of 12 cu. feet.

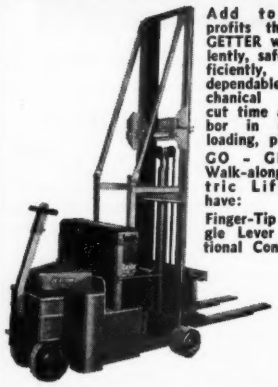
HAND TRUCK

NP9—Aerotrucker, a new multi-purpose hand truck is now being marketed



by Aerol Co., Inc. According to the release, the unit may be operated

REVOLVATOR GO-GETTER POWER LIFTRUCK



Add to your profits the GO-GETTER way. Silently, safely, efficiently, these dependable "mechanical men" cut time and labor in moving, loading, piling.

GO - GETTER Walk-along Electric Liftrucks have:

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Ball and Timken Bearings Throughout
Large Dual Differential Wheels
Heat-treated Stub Tooth 20° Spur Gears Running in Oil

SIX TYPES:

Low Lift Platform Skid
Low Lift Pallet
High Lift Counter-balanced Fork
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Tractor for Towing and Pushing

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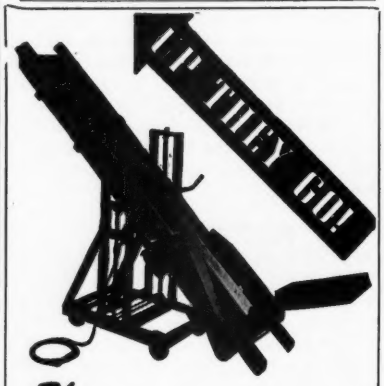

The

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TRANSFERS STAMPINGS AS FAST AS PRODUCED!

The "Little Hustler" is fully portable and quickly adjustable to a wide range of applications. The 8 foot size shown above has a maximum delivery height of 81 inches at 45° and 50 inches in a horizontal position. Made in 13 models: 4-6-8-10 and 12 ft. long, by 12", 18" or 24" wide. Also special sizes. Send for circular LHC. We design and manufacture permanent conveyor systems and all types of SPECIAL EQUIPMENT.

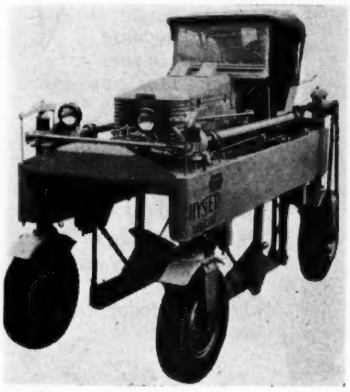
MAY-FRAN ENGINEERING, INC.

Development Engineering and Manufacturing
1710 Clarkstone Rd. Cleveland 12, Ohio

throughout its normal life without greasing. The Aerol wheels revolve on roller bearings that are factory-packed with a special water-proof lubricant. The model is constructed of a heavy-duty, cast-single-unit frame of light-weight, strong aluminum alloy. It is corrosion resistant, rust-proof and can be made spark-proof, it is stated.

STRADDLE TRUCK

NP10—The Hyster Co. is manufacturing an improved model "M" straddle



truck with 18,000-pound capacity. Replacing its 12,000-pound truck, the new machine is not larger in size, but because of a revised main frame structure and new hoist clutch arrangement, it is

CONCO HANDLING EQUIPMENT

CONCO TYPE DM OVERHEAD ELECTRIC CRANE

● WRITE today for complete information on the CONCO line of hand-powered and electric cranes, hoists and trolleys — a complete line, tried and proven for over twenty years. CONCO engineers are qualified to recommend the right type of handling equipment for faster, more economical production in your shop. Write us now, and take advantage of our long experience in moving more materials, faster and at less cost.

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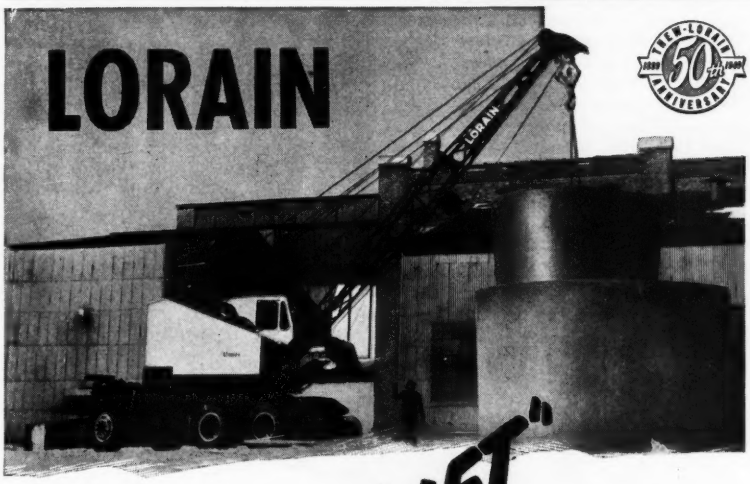

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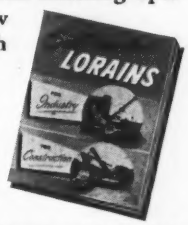
gives that new "LIFT" to MATERIAL HANDLING JOBS

Loads are heavy at the Lukenweld Division of the Lukens Steel Co., Coatesville, Pa. This paper mill machine cylinder weighs 4700 lbs., but it is just a leisurely lift for this Lorain TL-20 Self-Propelled Crane.

Using interchangeable hook block and electric magnet, this single-engine, rubber-tire mounted TL-20 brings economical "cranepower" to plant operations. It is one-man operated, travels at speeds up to 7 M.P.H.; may be equipped with 15 different crane attachments.

Give *your* material handling operations that new "lift" through "cranepower".



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THE THEW SHOVEL COMPANY
LORAIN, OHIO

thew-Lorain®

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SWIVEL CASTERS

- Single Ball Race
- Molded-On Rubber Tires

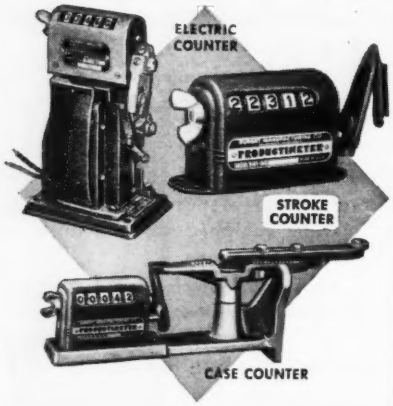
Heavy duty rubber tired wheel casters for jobs where floors suffer under heavy loads on metal wheels. Quiet, resilient, long lasting. The rubber will not separate from the metal. Hyatt type roller bearings. Wheel cores of heavy duty semi-steel. We serve resale dealers and original equipment manufacturers.

SPECIFICATIONS

No. Caster	Size Wheel	Bolt Hole Centers	Height	Capacity
44 SRC3	3x1⅜	2⅜x3 5/16	4¼	125 lbs.
44 SRC4	4x1½	2 11/16x3 11/16	5¼	150 lbs.
44 SRE4	4x2	3 3/16x4⅝	5¾	200 lbs.
44 SRE5	5x2	3 3/16x4⅝	6¾	250 lbs.
44 SRE6	6x2	4⅛x5½	7¾	310 lbs.

Buffalo CASTER & WHEEL CORP.
182-6 Breckenridge St., Buffalo, N. Y.

PRODUCTIMETERS *Count Everything*



Productimeters assure accurate count on every job . . . help prevent losses and maintain maximum production. There's a Productimeter for practically every industrial need.

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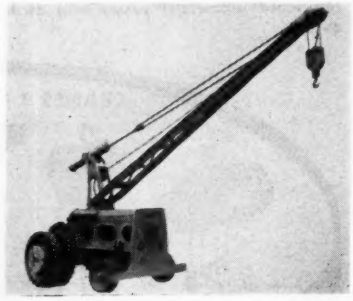
capable of carrying a heavier load. Greater visibility from the driver's seat has been attained by use of a forward sloping hood. One of the main features is a spring suspension system which is designed for better riding and steering, and gives more traction for driving wheels. It reduces frame stress and tire wear, and facilitates travel over slippery or rough road surfaces. It may be geared for maximum speeds of from 35 to 45 miles per hour.

TRACTOR-MOUNTED CRANE

NP11—The Clyde Iron Works, Inc., is offering an all-purpose tractor-mounted crane. Known as the Clyde Handi-Crane, the unit can pick up a load and



carry it wherever a tractor can go. It has a high lifting capacity of four tons. Its small, compact size allows it to work in congested areas. The model revolves 320 degrees so that loads can be picked up, carried or spotted on either side. The all-steel, welded boom is raised and lowered by means of a hydraulic cylinder that permits independent boom topping at all times. The hydraulic cylinder and boom are mounted on a turntable that rides between two rows of large-diameter steel balls.

PAPER ROLL TRUCK

NP12—An improved paper roll truck is now being produced by the Melooz Mfg. Co. The hardwood handles of this model are completely encased in forged

welded steel, at top, bottom, and base. According to the release, all contact surfaces are now built of steel, so that the truck is splinter-proof, and virtually

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PORTABLE SERVICE EQUIPMENT CO., Inc.
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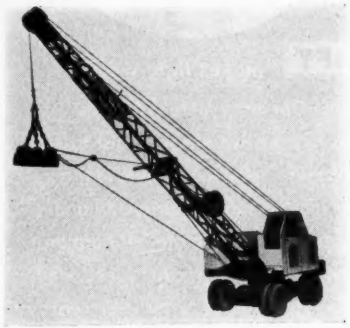
break-proof, in the hardest service. The truck is designed to handle paper rolls in all standard diameters, and in weights from 1000 to 3000 pounds. The tripod support is said to be instantly adjustable to every type of roll.

TIRE-MOUNTED CRANE

NP13—The Wayne Crane Division, American Steel Dredge Co., is manufacturing a line of tire-mounted cranes which, with various accessories and attachments, may be converted into any



one of six types of cranes. As shown here, the unit is operated as a magnet crane. It is equipped with a 36-inch magnet and a five kw. generator. The magnet will lift and handle approximately 700 pounds of fine, loose scrap.

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Lift a Load Off Your Mind

The sheer good performance an Abell-Howe crane gives year after year lifts crane worries off your mind for good. Down to the smallest part, every Abell-Howe Crane is built from finest materials. Into its design and construction goes the "know how" of an organization which has concentrated on dependable overhead equipment for 25 years. From every standpoint, investment cost as well as long-pull, worry-free performance, it will pay you to look into the equipment and service Abell-Howe offers. Write us about your crane problems.

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ABELL-HOWE CO.
53 W. JACKSON BLVD., CHICAGO 4, ILLINOIS
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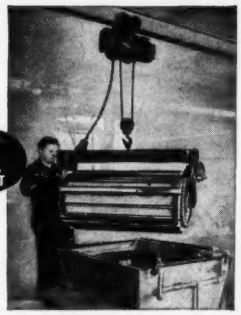
"Recovered 3 TIMES Its Cost in 2 YEARS Use . . . No Repairs or Replacements"*

THE *Titan* ELECTRIC HOIST



Handling material through the air saves floor space for production.

*Unsolicited statement made by a Michigan User, about a Titan Hoist.

The Titan is a powerful *little* hoist built with *Big* hoist features including Cone Worm Drive, Electric Brake, and Steel Wire Hoisting Rope.

*You can get profits in the same way with Titan Hoists handling things in your plant.

Ask For BULLETIN 801A on the Titan Hoist; also Bulletin 695 on light overhead cranes.

THE DETROIT *Titan* ELECTRIC HOIST
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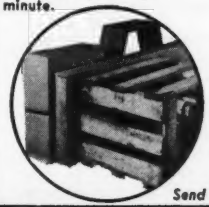
Easily Adaptable
TO MEET YOUR PRODUCTION NEEDS

UNITABLE

Power driven by standard POWER PAC compact motor unit. Belt speeds can be maintained from 6" to 80 feet per minute.

PORTABLE BELT CONVEYORS

Can be lengthened or shortened and moved easily to any location necessary in short order. Side counters can be added to one or both sides for more working space. Ruggedly built — Economical in use.



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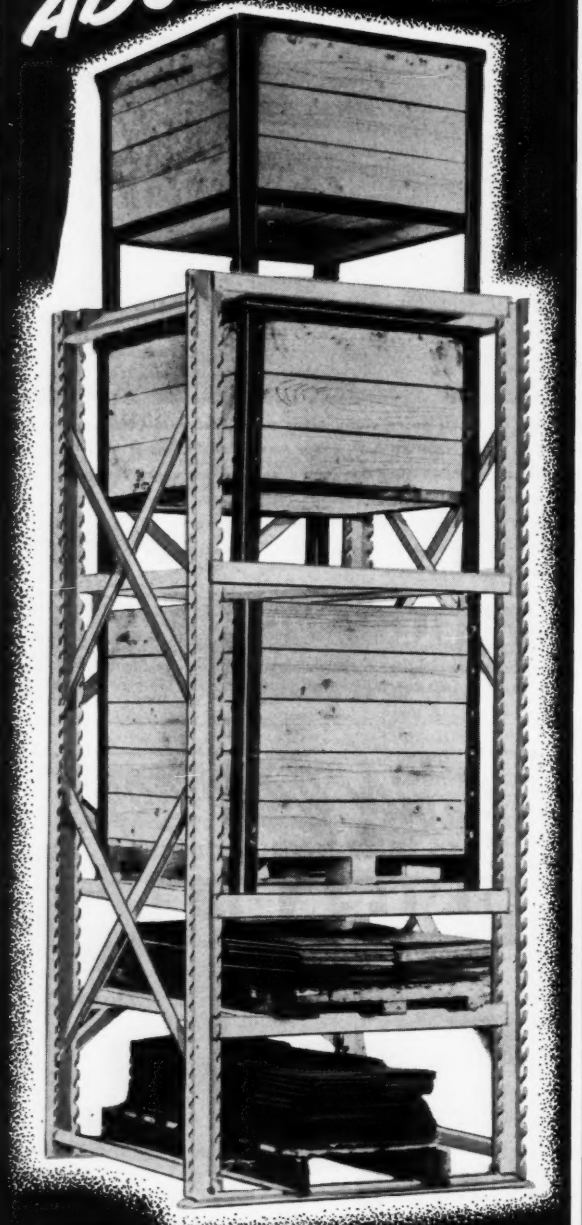

This pallet rack is fully adjustable without the use of bolts or wrenches! Your fork lift truck can quickly and accurately position shelves to the proper spacing.

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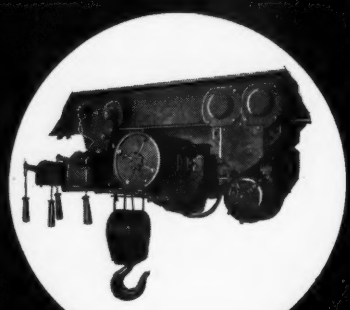

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of materials-handling. One man merely presses a button to get this worm-drive electric hoist to lift loads — up to 6 tons — and move them to the desired location. ElectroLift operates quietly and with very little power. For complete information on models to meet your capacity, speed and plant layout needs, phone or write your nearby ElectroLift representative listed in the classified telephone directory. Or write to address below.

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CUTS DELIVERY COSTS 50%

ANTHONY LIFT GATE HYDRAULIC

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*"LIFT GATE" rests on ground. No protrusions to prevent easy loading.

*Loads from all sides at all levels with "Quick Detachable" Ramp.

*Non-sloping—Gives *"Level-lift"* to avoid loads rolling or toppling off.

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*Safety Latch locks up. "LIFT GATE" cannot be lowered accidentally.

*Lower *"Point of Leverage"* gives more power with ¼ less working parts.

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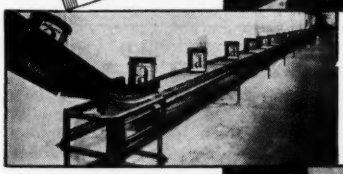
THIS WAY! Fully describes Gravity Rollers, ranging in sizes from ¾" dia. to 5 9/16" dia. in straight sections, "Y" sections, switch sections and hinged sections—standard and special lengths.



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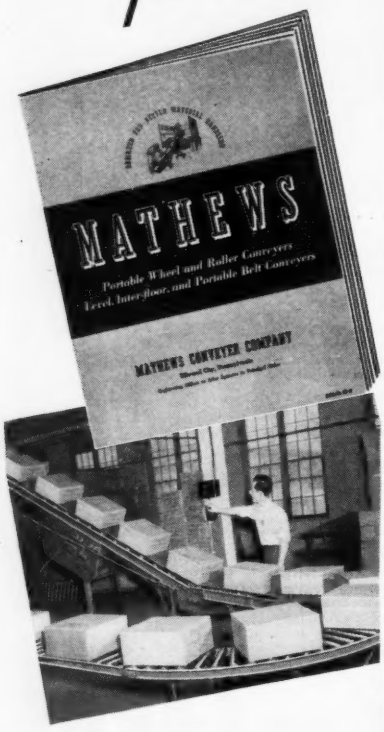

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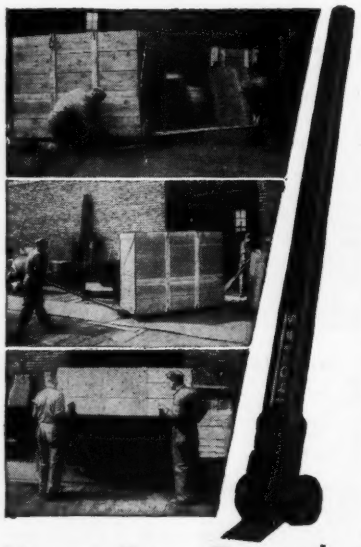

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Lift Platform Truck, Automatic Transportation Model LO-5, 27 inch x 6 foot platform. Six inch lift. 10,000 lb. capacity. Very good battery. Available for inspection at—
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Used 5-ton Victor Browning bridge crane. Specifications: Span 58 ft., runways 112 ft., length 23 ft., height, D. C. drive, cab operated. For additional information write The Lane Company, Inc., Engineering Department, Altavista, Virginia.

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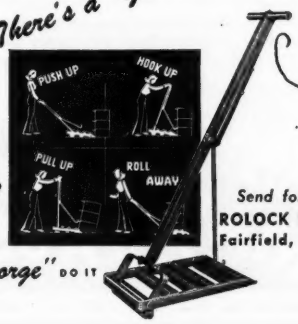

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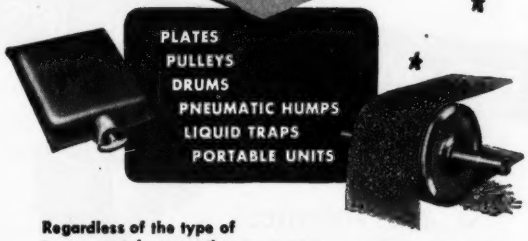

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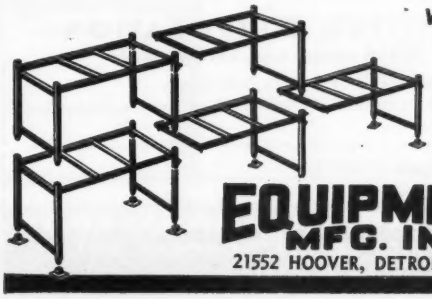

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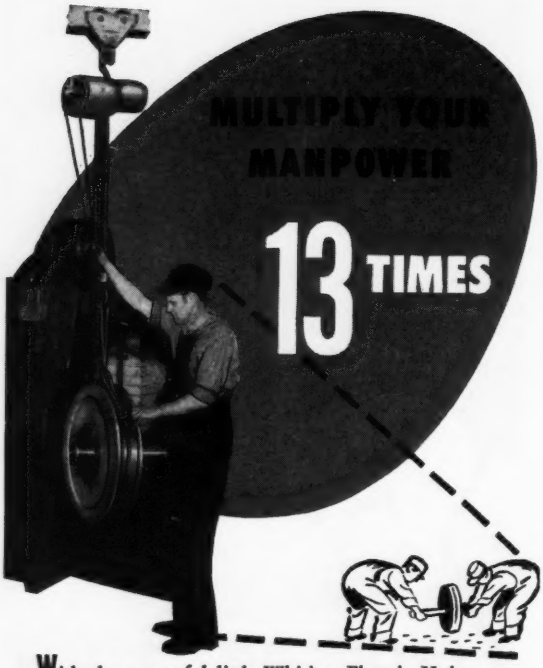

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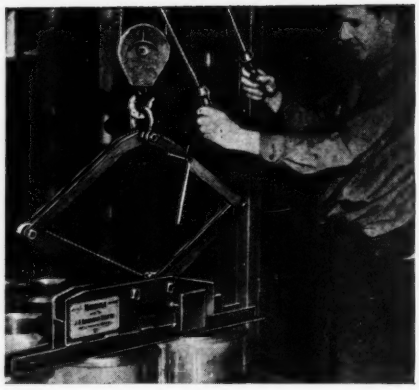

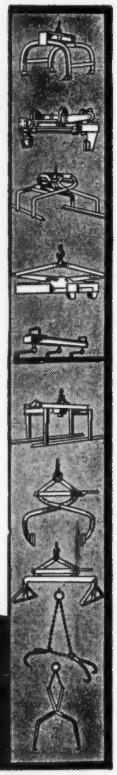

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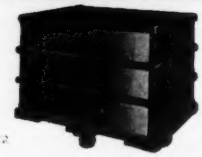

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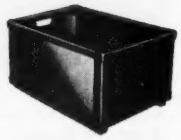

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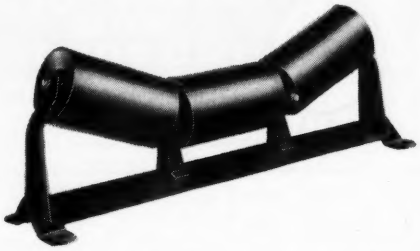

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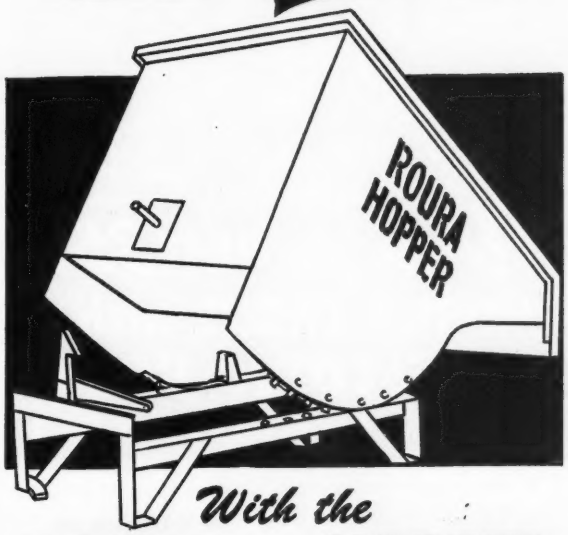

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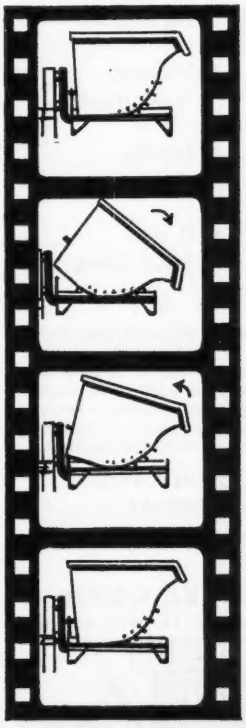

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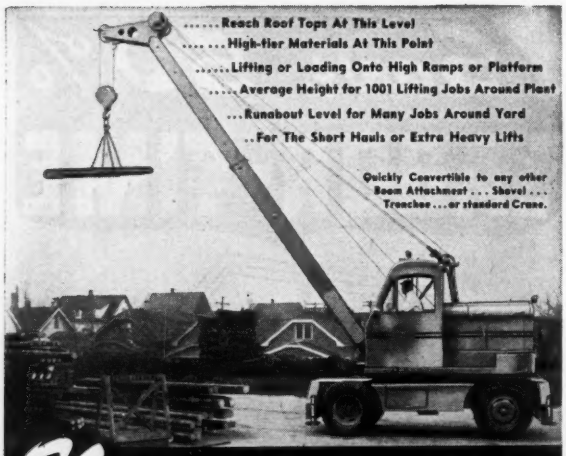
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6	15½	7	2½	2½	18
10	18	7½	3	2¾	28
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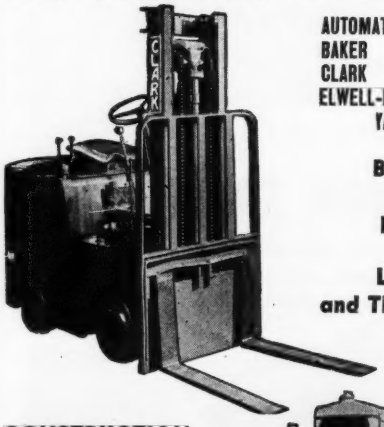

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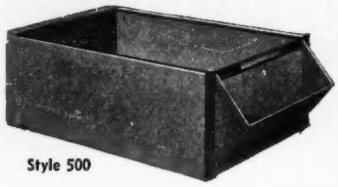

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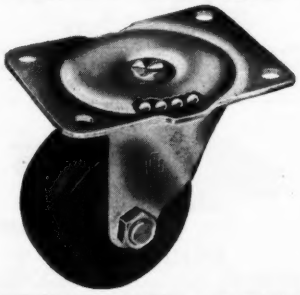

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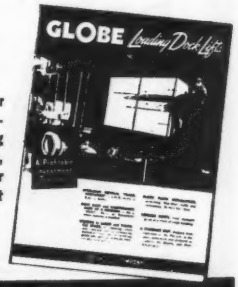

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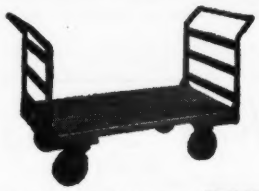

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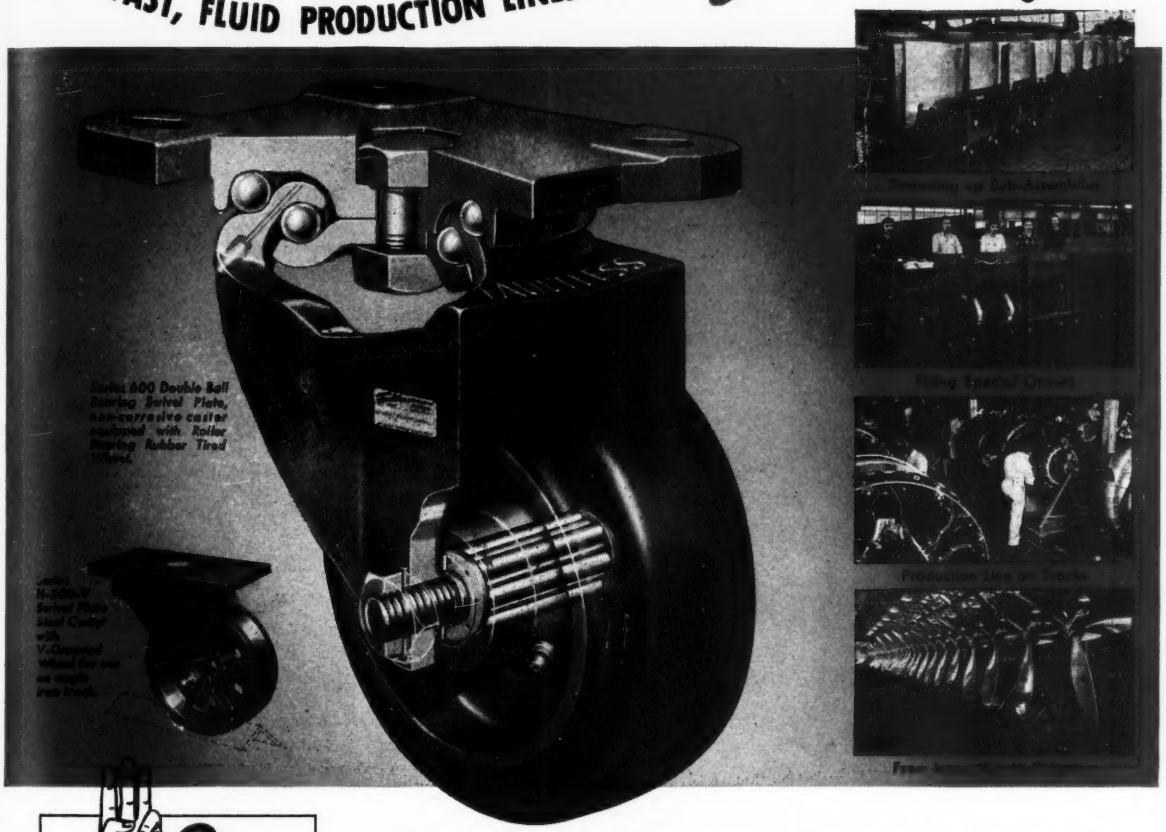

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